

# **FISHERIES MANAGEMENT AND EVALUATION PLAN**

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## **Lower Columbia River Coho Salmon Supplement**

**Prepared by**

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Summary of the expected tributary fisheries exploitation in the Lower Columbia Management Area. Exploitation includes incidental mortality due to other-species targeted fisheries.

## **Chinook**

### Lower Columbia Fall

#### Tule Fall

Tributary fishery impacts will not cause total fisheries (ocean, Columbia mainstem, and tributary) exploitation to exceed level developed for the PFMC/North of Falcon fisheries.

### Spring (fishery for 2002 on)

Cowlitz  $\leq 10 \%$

Kalama  $\leq 10 \%$

Lewis  $\leq 10 \%$

## **Steelhead**

Winter  $\leq 10 \%$

Summer  $\leq 10 \%$

Summer upstream of Bonneville  $\leq 4 \%$

## **Chum**

Lower Columbia  $\leq 4 \%$

## **Coho**

### Lower Columbia

Tributary fishery impacts will not cause total fisheries (ocean, Columbia mainstem, and tributary) exploitation to exceed level developed for the PFMC/North of Falcon fisheries for unmarked coho.

**Title: Fishery Management and Evaluation Plan: Lower Columbia River Region**

**Responsible Management Agency:**

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**Date Completed.**

WDFW submitted the original Lower Columbia River FMEP on February 21, 2001, the FMEP was updated and finalized in October 2003. The final FMEP covered impacts to listed steelhead, chinook salmon, and chum salmon. A letter of concurrence from NOAA Fisheries was signed December 29, 2003 authorizing these fisheries. This supplement to the LCR FMEP covers impacts to newly listed coho salmon. Some of the coho salmon FMEP sections are summaries and readers should examine the LCR FMEP for more detail.

**SECTION 1 FISHERIES MANAGEMENT**

**1.1) General objectives of the FMEP.**

The objectives of the Washington Department of Fish and Wildlife's (WDFW) Fish Management and Evaluation Plans (FMEPs) are based on the WDFW Wild Salmonid Policy (WDFW 1997a). In that policy, it states that harvest rates will be managed so that 1) spawner abundance levels abundantly utilize available habitat, 2) ensure that the number and distribution of locally adapted spawning populations will not decrease, 3) genetic diversity within populations is maintained or increased, 4) natural ecosystem processes are maintained or restored, and 5) sustainable surplus production above levels needed for abundant utilization of habitat, local adaptation, genetic diversity, and ecosystem processes will be managed to support fishing opportunities (WDFW 1997a). In addition, fisheries will be managed to insure adult size, timing, distribution of the migration and spawning populations, and age at maturity are the same between fished and un-fished populations. By following this policy, fisheries' impacts to listed steelhead, chinook salmon, chum salmon, and coho salmon in the Lower Columbia River (LCR) Evolutionary Significant Units (ESU) will be managed to promote the recovery of these species and not at rates that jeopardize their survival or recovery.

The primary focus of anadromous salmonid fisheries in the LCR is to target harvest of known hatchery origin steelhead, spring chinook, coho salmon, sea-run cutthroat, and fall chinook. The

primary focus for resident game and non-game fish in the LCR tributaries is to 1) provide recreational opportunities, 2) minimize impacts to juvenile anadromous fish through time and area closures, and 3) minimize impacts to listed species.

### **1.1.1) List of the “Performance Indicators” for the management objectives.**

Performance indicators of fish populations include parameters such as abundance, freshwater carrying capacity, survival through the migration corridor, ocean productivity, intrinsic productivity of the stock, and recruits per spawner. Based on these parameters, fisheries and extinction risks are established to maintain the abundance of the stock above a level that does not compromise the existence of the stock and allows fishery management objectives to be met. To develop fisheries using this approach, precise and accurate estimates of wild run size, escapement, harvest, age structure, fecundity, stray rate, smolt production, and smolt-to-adult survival are needed. In addition, the number of hatchery spawners and their reproductive successes in the wild are also needed for each stock or population. Due to limited resources, this information is rarely collected with enough accuracy and precision for every stock to develop individual fisheries or extinction risks as described above. WDFW recognizes there are substantial data gaps for coho salmon across the ESU. In the Monitoring and Evaluation section of this FMEP, we have outlined an approach to expand data collection to provide more accurate data for coho risk assessment.

For coho salmon **Trap Counts** are conducted on the Elochoman, Cowlitz, Green, NF Toutle, Kalama, and Wind rivers, and on Cedar Creek (NF Lewis River tributary). Systematic spawning ground surveys to estimate escapement are generally not conducted, but surveys for coded-wire-tag (CWT) recovery and to document adult salmon presence occur periodically. Coho salmon information is also collected incidentally during the conduct of directed fall chinook and chum salmon surveys. In 2004 WDFW conducted comprehensive redd surveys to estimate coho escapement in Mill, Abernathy, and Germany Creeks. In addition, spawning was documented in other lower Columbia tributaries. A floating-type weir will be installed in Abernathy Cr. starting in fall 2005 to monitor upstream escapements of all salmonids, and PIT tagging of adult coho will occur at the weir to monitor upstream movement. All sampling of carcasses and trapped fish include recovery of CWT marked fish for hatchery or wild stock evaluation.

**Downstream migrant trapping** occurs on the Cowlitz, Kalama, and Wind rivers, Cedar, Germany, Mill, and Abernathy creeks, and was expanded to the Coweeman River in 2005 as part of a salmonid life cycle monitoring program to estimate freshwater production and wild smolt to adult survival rates. **Genetic analysis** and **fish health monitoring** may occur in any tributary in the LCMA.

Performance indicators for fisheries include estimates for the catch, catch rates, harvest rates, hooking mortality for fish caught and released, effort of the fishery, and catch per unit effort (CPUE) for the fishery. WDFW typically makes statistically based estimates of steelhead and salmon catch from the WDFW catch record card (CRC) and follow-up phone surveys. To calculate the freshwater fishery wild steelhead and salmon sport fishing mortality rate (the

indirect mortality that can occur from wild fish release) biologists determine the wild interception rate by expanding the number of wild fish released from the creel surveys by the ratio of total catch from the CRC divided by the number of fish sampled during the creel surveys, or by using other information to estimate the expected natural origin salmon interception rate in each fishery indirectly. Creel surveys are conducted on the Cowlitz and NF Lewis rivers to collect fisheries data for steelhead and salmon. Creel surveys are also conducted during chinook and coho fisheries on the Grays, Elochoman, Cowlitz, Toutle, Kalama, Lewis, Washougal, Wind, and Little White Salmon rivers to evaluate these fisheries.

### **1.1.2) Description of the relationship and consistency of harvest management with artificial propagation programs.**

Harvest of salmon and steelhead in the LCMA is managed to meet wild salmon and steelhead escapement objectives, and to meet the objectives of artificial propagation programs. To manage harvest to meet these goals WDFW has developed escapement objectives for all hatchery populations, and some wild populations. Interim maximum harvest rates have been established for the remaining identified wild stocks. Fishing seasons are then established based on a forecast of salmon and steelhead returning to the LCMA. In years where run size to the tributaries is forecast to be below escapement requirements, harvest in tributaries is eliminated, or reduced to limited mortality from wild salmon or steelhead release. Harvest reductions are accomplished by time and area closures, gear restrictions, or changes in the daily catch limits. When forecasts are not made, conservative harvest rates are established. These rates are less than the estimated maximum sustainable yield (MSY) harvest rates under low ocean productivity or Recovery Exploitation Rates established by the National Marine Fisheries Service (NMFS) (NMFS 2000a). To the extent possible WDFW uses selective fisheries to maximize harvest rates on hatchery stocks, while managing for directed or incidental wild stock harvest rates that are consistent with wild stock protection and/or rebuilding. Artificial propagation programs within the LCMA have three purposes: 1) rebuild wild populations that are at risk and/or re-establish wild populations that have been extirpated, 2) determine the benefits and risks of artificial propagation programs have on wild populations through research and develop strategies that maximize benefits and minimize risks, and 3) provide for harvest opportunity.

### **Restoration Programs**

Hatcheries have and will continue to play an important role in recovering wild populations. Currently, WDFW is engaged in re-introduction programs in the Cowlitz basin for coho salmon and other anadromous species. Returning wild adults and adults from the locally adapted hatchery in the lower river are released above Cowlitz Falls to establish naturally spawning populations. Where possible, these recovery fish are marked for evaluation purposes. In some cases, fish above recovery needs are differentially marked and released along with recovery fish to provide fishery opportunity. A large proportion of the hatchery origin coho releases upstream of Bonneville Dam are not currently being ad-clipped, in order to meet state/tribal fishery management and salmon restoration objectives, which include maximizing adult returns to tribal fisheries upstream of Bonneville Dam by minimizing take in mark-selective ocean and estuarine sport fisheries, and providing maximum possible escapements to natural spawning and broodstock recovery locations in mid and upper Columbia basin locations outside of the ESU where coho re-introduction programs are ongoing.

## **Research Programs**

To better understand the risks and benefits to wild populations from hatchery programs, gene flow, reproductive success, and ecological interactions between hatchery and wild fish are studied. Research projects are developed that address specific needs, and go through a peer review process including assessment of experimental design to accomplish the objectives and a risk analysis. Only after this rigorous review process are projects approved. A variety of internal and external marks are used to evaluate different test groups and replicates. Harvest of these experimental fish may be controlled to meet study design goals through selective fisheries. In 2005 a program was implemented on the Cowlitz River to assess predation on juvenile wild salmonids from juvenile hatchery steelhead.

## **Harvest Programs**

The purpose of the majority of hatchery programs in the LCMA are to provide harvest opportunity. Hatchery coho salmon are adipose-fin marked to allow quick identification of these hatchery fish intended for harvest. The presence of the adipose fin also allows for quick identification of wild stocks, so anglers can limit the handling of these fish. All hatchery coho released within the ESU have been ad marked starting with the 1995 brood year. Experimental/study groups (double index tagging), the majority of coho released upstream of Bonneville Dam, and the surplus production fry released into the Cowlitz and Lewis River reservoirs to provide freshwater coho sport fishing opportunities are not adipose fin-clipped. All in-river coho sport fisheries downstream of Bonneville Dam have been selective starting with the 1998 return year. Coho sport fisheries in the mainstem and tributaries upstream of Bonneville Dam are currently non-selective due to the presence of large numbers of unmarked hatchery coho in these fishery areas.

WDFW has proposed integrated hatchery programs coho salmon, in which every effort is made to maintain similarities in between hatchery and wild fish. Guidelines for this type of program generally include the following: 1) incorporating wild fish annually into the broodstock; 2) maintaining similar genetic and biological characteristics between hatchery and wild populations including size, age, size and age at maturity, age at ocean entry, fecundity, sex ratio, run timing, and spawning time; 3) limiting the proportion of hatchery spawners by managing for intense selective fisheries, and maintaining high trapping efficiencies at hatcheries and adult traps that remove hatchery fish prior to spawning; 4) using hatchery management practices, acclimation, timing, and lower river releases to limit competition and predation that can occur from hatchery releases; and 5) following (IHOT 1995) guidelines to limit disease risks from hatchery salmon and steelhead. Hatchery Genetic Management Plans have been developed for artificial propagation programs for facilities located on Lower Columbia River tributaries.

### **1.1.3) General description of the relationship between the FMEP objectives and Federal tribal trust obligations.**

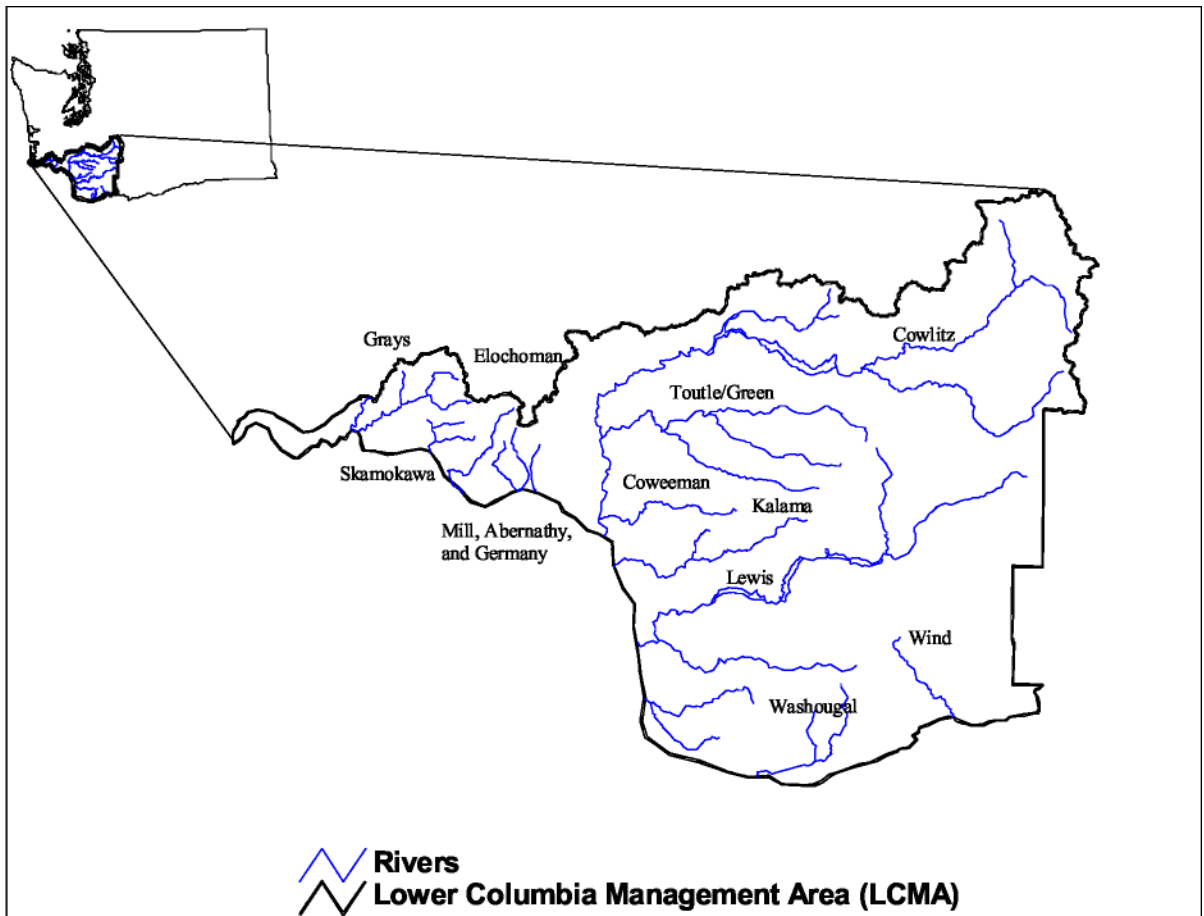
Tribal fisheries below Bonneville Dam do not currently exist. The extent of treaty tribal fishing rights below Bonneville Dam has not been adjudicated. In the event that tribes are found to have treaty rights below Bonneville Dam, WDFW will work with the tribes to develop LCMA

tributary fisheries consistent with the protection of ESA listed stocks and harvest sharing. Treaty Indian fisheries promulgated by the member Tribes of the Columbia River Inter-Tribal Fish Commission are conducted in the tributaries above Bonneville Dam. The Yakama Nation (YN) currently has fisheries in the Wind River watershed. This fishery is not regulated by WDFW. Each tribe has retained their authority to regulate their fisheries, and issues fishery regulations through their respective governing bodies. The tribes are represented by their staff on the Technical Advisory Committee, and participate in monitoring activities and data sharing with other parties. The tribes have policy representation in the *U. S. v. Oregon* harvest management processes.

## **1.2) Fishery management areas**

### **1.2.1) Description of the geographic boundaries of the management area of this FMEP.**

Since the LCR ESU is not consistent between species, we have defined the LCMA for Washington, as the area from the mouth of the Columbia River upstream and including the Wind River Watershed (Figure 1). For coho salmon the boundary has been extended to the Big White Salmon River for consistency with the ESU boundary for listed Lower Columbia River coho salmon. This FMEP covers all of Washington's freshwater fisheries in the LCR excluding those conducted in the mainstem of the Columbia River, which are covered in a Section 7 and/or 10 consultation under *US v Oregon*. This plan includes recreational fisheries in the anadromous portions of independent tributaries entering into the LCR from the mouth of the Columbia River up to and including the Big White Salmon River. These include the Grays, Skamokawa, Elochoman, Cowlitz, Kalama, Lewis, Salmon, Washougal, Wind, and Big White Salmon watersheds, as well as independent lower Columbia River tributary creeks in Wahkiakum, Cowlitz, Clark, Skamania, and Klickitat counties that are accessible to LCMA salmonids.



**Figure 1.** The Lower Columbia River Management Area.

### **1.2.2) Description of the time periods in which fisheries occur within the management area.**

Fisheries in LCMA tributaries occur year-round. Recreational fisheries include targeted spring chinook, fall chinook, summer steelhead, winter steelhead, coho, trout, sturgeon, smelt, crayfish, shad, and fisheries directed at other native and non-native species. Most harvest impacts to listed species occur in the targeted fishery and few impacts occur in non-targeted fisheries. Chinook, chum, and coho fisheries are closed year-round unless specifically listed as open. Spring chinook fisheries commence as fish begin entering the tributaries in February and March and typically close in August to protect spawners. Tributary fall chinook fisheries occur from August through January. Tule stocks are present in most LCMA tributaries and fisheries peak in September. The Lewis River fall chinook stock is a later timed stock with peak fishing in October. Chum salmon are present in tributaries from October through January. Washington tributaries have been closed to chum salmon fishing since 1995. Fisheries targeting winter steelhead are concentrated from December through February and close by March 15. In the Cowlitz, Kalama, Lewis, and Washougal basins winter steelhead fisheries extend through May 31. Summer steelhead enter fisheries from March through October and most of the catch occurs from late May through August. Coho sport fishery time periods vary between tributaries, with some streams open year

around, and in other streams with chinook and/or steelhead conservation concerns the starting and ending periods are set to be concurrent with management dates for chinook and/or steelhead fisheries. The only tributaries open to marked coho retention are the Grays, Deep, Elochoman, NF Lewis, Cowlitz, Toutle/Green, Kalama, Washougal, Big White Salmon, and Wind Rivers. All of these streams except the Wind and Big White<sup>1</sup> have major annual juvenile hatchery coho release programs. The majority of coho catch occurs during the August-December time period in these tributaries, even for the streams that are open year around for marked coho retention.

Fisheries in the LCMA occur for non-listed fish including trout, sturgeon, shad, smelt, warmwater fish, and crayfish. Shad and sturgeon fisheries are opened in LCMA tributaries but the fishery effort is concentrated in the mainstem Columbia River and is very low in the LCMA tributaries. Shad and sturgeon fishing is open year-round, however shad fishing is concentrated from May through July. Non-hook and line fisheries occur for smelt and crawfish in LCMA tributaries. Participants in the smelt fishery use dip nets, while crawfish anglers primarily use pots or traps. Fishing for smelt occurs primarily from January to April and fishing for crawfish primarily occurs in the late spring and summer. The freshwater game fish (rainbow, cutthroat, and brook trout, largemouth and smallmouth bass, panfish) fishing season is open from June 1 to October 31 in LCMA tributaries.

### **1.3) Listed salmon and steelhead affected within the Fishery Management Area specified in section 1.2.**

Listed salmon and steelhead present in LCR include lower Columbia River chinook salmon ESU (threatened effective May 24, 1999), lower Columbia River chum salmon ESU (threatened effective May 24, 1999), lower Columbia River steelhead ESU (threatened effective May 18, 1998), and lower Columbia River coho ESU (threatened effective June 28, 2005). The salmon and steelhead natural populations in Table 1 are from the 1992 Salmon and Steelhead Stock Inventory (SASSI) (WDF et al. 1993). The stock definition in SASSI is “The fish spawning in a particular lake or stream(s) at a particular season, which to a substantial degree do not interbreed with any group spawning in a different place, or in the same place at a different season.” All tributary fisheries for anadromous salmonids will be selective fisheries (all returning hatchery adults will have external marking) except for spring chinook fisheries above Bonneville Dam, and the fall chinook directed fisheries. Mass marking programs have been established for hatchery spring chinook downstream of Bonneville Dam. Selective fisheries allow for “weak stock” protection by only allowing harvest of healthy hatchery stocks.

Coho salmon were likely native to all tributaries accessible to anadromous salmonids in the ESU. The current extent of natural production on the Washington side of the ESU is under study. Significant natural juvenile coho production has been measured in Germany, Mill, Abernathy, and Cedar creeks (NF Lewis tributary), and the Upper Cowlitz, Tilton, Coweeman, EF Lewis rivers. Natural origin adult returns have been monitored in Cedar Creek and the Cowlitz River, and monitoring has been initiated on Germany, Mill, and Abernathy Creeks starting in fall 2004. The parentage (hatchery or wild) of the observed juvenile and adult

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<sup>1</sup> The coho catch in the Big White and Wind fisheries primarily consist of “dip-in” hatchery coho caught near the Columbia River confluence, that originated from other release locations

production is currently under investigation.

**Table 1.** List of the natural coho salmon populations and associated hatchery stocks as determined by SASSI and W/LCR Technical Review Team.

SASSI Populations	Hatchery Programs	LCR TRT Populations
Grays River Coho	Grays Early	Grays River
Skamokawa Creek Coho		Elochoman River
Elochoman River Coho	Elochoman Early and Late	
Mill Creek Coho		Mill, Germany, Abernathy
Abernathy Creek Coho		
Germany Creek Coho		
Cowlitz River Coho	Cowlitz Late	Cowlitz Upper and Lower River
Coweeman River Coho		Coweeman River
Toutle River Coho	Toutle/Green Early	N.F. Toutle River
Green River Coho	Toutle/Green Early	
SF Toutle River Coho	Toutle/Green Early	S.F. Toutle River
Kalama River Coho	Kalama Early and Late	Kalama River
Lewis River Coho	Lewis Early and Late	N.F. Lewis River
EF Lewis River Coho		E.F. Lewis River
Salmon Creek Coho		Salmon Creek
Washougal River Coho	Washougal Late	Washougal River
Bonneville Tributaries		Lower Gorge, Upper Gorge, & Big White Salmon River

### **1.3.1) Description of “critical” and “viable” thresholds for each population (or management unit) consistent with the concepts in the document “Viable Salmonid Populations and the Recovery of Evolutionarily Significant Units.”**

The NMFS defines population performance in terms of abundance, productivity, spatial structure, and diversity and provides guidelines for each (McElhany et al. 2000). The NMFS identifies abundance guidelines for critical and viable population thresholds. Critical thresholds are those below which populations are at relatively high risk of extinction. Critical population size guidelines are reached if a population is low enough to be subject to risks from: 1) compensatory processes, 2) genetic effects of inbreeding depression or fixation of deleterious mutations, 3) demographic stochasticity, or 4) uncertainty in status evaluations. If a population meets one critical threshold, it would be considered to be at a critically low level. Viability thresholds are those above which populations have negligible risk of extinction due to local factors. Viable population size guidelines are reached when a population is large enough to: 1) survive normal environmental variation, 2) allow compensatory processes to provide resilience to perturbation, 3) maintain genetic diversity, 4) provide important ecological functions, and 5) not risk effects of uncertainty in status evaluations. A population must meet all viability population guidelines to be considered viable.

Productivity or population growth rate guidelines are reached when a population’s productivity

is such that: 1) abundance can be maintained above the viable level, 2) viability is independent of hatchery subsidy, 3) viability is maintained even during poor ocean conditions, 4) declines in abundance are not sustained, 5) life history traits are not in flux, and 6) conclusions are independent of uncertainty in parameter estimates. Spatial structure guidelines are reached when: 1) number of habitat patches is stable or increasing, 2) stray rates are stable, 3) marginally suitable habitat patches are preserved, 4) refuge source populations are preserved, and 5) uncertainty is taken into account. Diversity guidelines are reached when: 1) variation in life history, morphological, and genetic traits is maintained, 2) natural dispersal processes are maintained, 3) ecological variation is maintained, and 4) effects of uncertainty are considered.

This fishery management plan focuses primarily on maintaining harvest rates that are consistent with recovery. Spatial structure is generally a function of habitat size and distribution. Recreational fisheries discussed in this management plan do not affect habitat. The estimated fishery impact rates are small and will not reduce population sizes to levels where spatial effects are exacerbated. These small impact rates on wild fish are not expected to exert enough selection pressure on any single characteristic to affect diversity. Periodic poor cohorts are inevitable but an extended sequence of poor survival should trigger consideration of more conservative management strategies and this consideration should be tied to fish numbers. Lower cohort survivals are expected at very large escapements because the available habitat can be over-seeded. Poor replacement rates under these conditions should not trigger a conservative management response. Fishery closures after critical low escapement levels are reached provide limited benefits because too few fish are affected at low run sizes to substantially increase escapement. To reduce the likelihood of this happening, WDFW is implementing harvest regimes that were developed under the lowest survivals to ensure adequate levels of escapement are available even during the least productive years.

Definition of an appropriate viability threshold depends largely on the capacity and productivity of the available habitat and the corresponding population size where compensatory population processes begin to provide resilience. Extensive monitoring of hatchery salmon and the institution of appropriate monitoring programs will provide the necessary information in the future but preliminary estimates of productivity and capacity will require a minimum of ten years of age-specific escapement data.

The NMFS provides limited guidance on fish numbers corresponding to critical and viability thresholds. They discuss hypothetical risks related to genetic processes effective at annual spawning population ranging from 50 to several thousand individuals. The NMFS' Viable Salmonid Populations guidelines include multiple cautions about the effects of uncertainty in population assessments and also recommend an adaptive management approach for reducing uncertainty (McElhany et al. 2000). Preliminary viable and recovery goals have been established by McElhany et al. (2004) and Lower Columbia Fish Recovery Board (LCFRB) and are presented in Table 2. The methodology for establishing recovery goals is described in LCFRB (2004). It should be noted that the viability goal assumes no hatchery fish presence, and average ocean conditions. Due to resource constraints, the recovery goals for coho salmon made assumptions that the distribution of coho and steelhead spawning was the same, which under-estimates the actual coho salmon distribution. WDFW and LCFRB are developing more specific information to be included in the salmon and steelhead recovery

plan for the Lower Columbia River.

**Table 2.** Preliminary recovery goals for Lower Columbia River coho salmon populations from LCFRB salmon and steelhead recovery plan.

	Scenario	Viability		Abundance			
Population	contrib.	Current	Goal	Current	Viable	Potential	Goal
<b><u>Coast</u></b>							
Grays/Chinook	Primary	Low	High	na	600	4,600	600
Eloch/Skam	Primary	Low	High	na	600	7,000	600
Mill/Ab/Germ	Contributing	Low	Med	na	600	3,700	300
Youngs (OR)	Stabilizing	na	Low	na	600	1,200	na
Big Creek (OR)	Primary	na	High	na	600	1,200	na
Clatskanie (OR)	Stabilizing	na	Low	na	600	1,200	na
Scappoose (OR)	Primary	na	High	na	600	1,200	na
<b><u>Cascade</u></b>							
Lower Cowlitz	Primary	Low	High	na	600	19,100	600
Coweeman	Primary	Low	High	na	600	7,600	600
S.F. Toutle	Primary	Low	High	na	600	32,900	600
N.F. Toutle	Primary	Low	High	na	600	1,200	600
Upper Cowlitz	Contributing	V Low	Med	na	600	28,800	300
Cispus	Contributing	V Low	Med	na	600	6,600	300
Tilton	Contributing	V Low	Low	na	600	4,000	150
Kalama	Contributing	Low	Med	na	600	1,300	300
NF Lewis	Contributing	Low	High	na	600	5,900	600
EF Lewis	Primary	Low	High	na	600	4,100	600
Salmon	Stabilizing	V Low	V Low	na	600	5,700	75
Washougal	Contributing	Low	Med	na	600	4,200	300
Clackamas (OR)	Primary	na	High+	1,684	600	1,200	na
Sandy (OR)	Primary	na	High+	587	600	1,200	na
<b><u>Gorge</u></b>							
L Gorge (Hamilton)	Primary	Low	High	na	600	1,200	600
U Gorge (Wind)	Primary	Low	High	na	600	1,100	600
White Salmon	Contributing	V Low	Low	na	600	1,200	150
Hood (OR)	Contributing	na	Med	na	600	1,200	na

**1.3.2) Description of the current status of each population (or management unit) relative to its “Viable Salmonid Population thresholds” described above. Include abundance and/or escapement estimates for as many years as possible.**

Due to the large-scale hatchery program for coho salmon in this ESU hatchery salmon are commonly observed on the natural spawning grounds. In the viability model used by the TRT the presence of hatchery fish on the spawning grounds requires assumptions that produce

unrealistic viability goals. Due to these technical issues description of the current status of coho salmon populations in terms of viability goals is not possible at this time. Estimates of coho salmon passed above traps and barriers in the Washington section of the LCMA is presented in Table 3. Only the Wind, NF Toutle, and Cowlitz counts are complete counts. At the remainder of the sites a portion of coho salmon are able to successfully pass the barrier without being counted.

Due to the reduction of natural coho abundance in much of the Lower Columbia ESU to very low levels by the mid 20<sup>th</sup> Century, and the subsequent shift to hatchery coho production oriented management practices WDFW does not have historical estimates of natural coho spawner abundance for any Washington populations the ESU extant of partial estimates of natural escapement to Grays River, Elochoman, Toutle, Cedar Cr., Cowlitz, and Wind River (Table 3). Total annual coho runsize and escapement to the Lower Columbia ESU are summarized in Table 4 for the hatchery and natural populations in aggregate.

**Table 3.** Coho salmon abundance estimates in the LCMA from monitoring sites (% Un- is the proportion of unmarked coho).

Run Year	Grays R		Elochoman R		Cowlitz@Barrier		Toutle@FCF		Green R		Cedar Cr		Wind R	
	Total Released	% Un-	Total Released	% Un-	Total Released	% Un-	Total Released	% Un-	Total Released	% Un-	Total Released	% Un-	Total Released	% Un-
1990-1991							104	n/a						
1991-1992							303	n/a						
1992-1993							65	n/a						
1993-1994							96	n/a						
1994-1995							87	n/a						
1995-1996	4	n/a	800	n/a	6,441	n/a	82	n/a	1,517	n/a				
1996-1997	7	n/a	700	n/a	6,049	n/a	118	n/a	13,529	n/a				
1997-1998	56	n/a	311	n/a	9,509	n/a	162	n/a	6,816	n/a				
1998-1999	13	n/a	30	n/a	16,993	n/a	24	n/a	12,878	n/a	911	28%		
1999-2000	504	n/a	2,474	n/a	37,424	17%	94	n/a	10,916	n/a	305	51%	10	50%
2000-2001	6,209	0%	7,861	4%	58,352	4%	629	n/a	16,528	0%	1,000	41%	32	53%
2001-2002	2,380	0%	8,177	1%	78,597	8%	396	16%	10,735	0%	1,261	25%	454	23%
2002-2003	431	5%	9,806	2%	89,753	12%	296	66%	10,700	3%	1,064	77%	35	60%
2003-2004	457	32%	5,427	6%	44,755	21%	574	83%	15,963	13%	1,110	86%	11	64%
2004-2005	1,526	0%	5,250	3%	44,709	11%	329	96%	11,300	2%	305	51%	17	76%

**Table 4.** Estimates of minimum in-river runsize, catch, and escapement in thousands of adult coho entering the Columbia River (PFMC 2005)

Year or Average	Minimum run size	Below Bonneville Dam					Above Bonneville Dam			
		Lower River Catch			Lower River Escapement		Bonneville Dam Counts	Mainstem Commercial Treaty Catch	Zone 6 Escapement	Hatchery Escapement
		Comm	Buoy 10	Mainstem	Hatchery	Tributary Dam Counts				
1971-75	367.3	194.2	-	11.7	117.1	8.5	35.8	8.3	27.6	12.1
1976-80	229.9	101.8	-	9.4	94.3	3.5	20.8	2.1	18.7	6.0
1981-85	581.3	316.3	48.5	14.8	142.7	5.8	53.3	5.6	47.7	16.5
1986-90	474.2	245.1	72.8	12.0	114.7	5.0	25.6	2.7	22.9	7.0
1991	954.3	407.5	208.7	31.6	243.3	5.5	58.9	6.7	52.2	18.0
1992	217.7	54.1	43.1	9.0	88.6	5.2	17.8	1.0	16.8	5.2
1993	114.2	35.6	20.9	6.9	39.4	0.8	10.6	0.9	9.7	1.7
1994	169.1	60.7	1.8	4.1	78.0	4.1	20.3	1.0	19.3	3.9
1995	75.2	21.4	5.0	3.2	32.2	2.9	10.4	0.3	10.1	1.5
1996	104.6	19.8	4.5	3.9	60.2	0.6	15.7	0.1	15.6	1.4
1997	145.3	16.4	20.4	11.6	69.9	2.8	24.2	0.6	23.6	4.4
1998	164.5	23.0	3.2	6.7	83.8	1.3	46.6	0.2	46.4	11.3
1999	273.6	79.0	8.9	18.1	123.9	1.0	40.7	1.7	39.0	10.0
2000	549.6	168.4	21.5	36.5	232.0	5.6	85.6	6.3	79.3	26.6
2001	1,108.1	253.1	132.0	76.7	378.5	8.2	259.6	5.5	254.0	80.6
2002	511.6	163.0	6.2	35.5	215.2	3.6	88.1	1.6	86.5	2.9
2003	683.7	257.3	54.4	29.8	205.2	11.2	125.7	2.6	123.2	3.9
2004	446.0	109.8	15.3	22.3	178.7	5.3	115.0	6.4	108.6	6.2

#### 1.4) Harvest Regime

Harvest of listed salmon and steelhead in the LCMA is both direct and indirect. Direct harvest occurs when legally caught listed fish are retained as part of the daily limit. Directed in-river sport coho harvest will be limited to retention of ad-marked hatchery origin coho only. Indirect harvest can occur when listed fish are caught and released. Indirect harvest, or better described as sport fishing hooking mortality, is a function of the number of fish caught and released and the mortality of those released fish. The sport fishing hooking mortality rate is the interception rate multiplied by the hooking mortality rate. The interception rate is the total number of salmon or steelhead caught and released divided by the run size. The hooking mortality rate is the percentage of released fish that do not survive after being caught and released. Any impact to wild coho salmon in the LCMA will occur as a result of indirect harvest. Tributary fisheries will continue to be managed for wild coho release.

#### Hooking Mortality

WDFW has used selective fisheries to reduce the impacts to listed coho salmon and other salmonids. WDFW is applying a “drop off” (fish that are hooked but not landed) mortality rate of 5%, and a release mortality rate of 10% for analysis of tributary coho fisheries in this

document. These rates that are currently used for Freshwater Recreational fisheries in the FRAM model (Model Evaluation Workgroup, 2004). WDFW is also concerned with the spawning success of salmon and steelhead that survive from catch and release, though WDFW does not have coho-specific information on this subject. Pettit (1977) studied the reproductive success of female hatchery steelhead caught and released on the Clearwater River in Idaho. The results of this study indicate the reproductive success of female steelhead caught and released, that were spawned in the hatchery was the same as uncaught female steelhead. Nelson et. al. (2005) observed that the maximum mortality from catch and release steelhead fisheries in the Chilliwack River, British Columbia was 1.4 % and 5.8 % in two years of study, and incidence of post-spawning death of steelhead did not vary with the frequency of capture and release.

### **Interception Rates**

WDFW has not estimated the number of wild steelhead and coho parr and smolts that are caught during resident fisheries. It is likely that most interception occurs during trout fisheries. WDFW has limited hatchery trout plants to resident production areas above natural barriers or above dams. Since most trout anglers focus on these areas or lakes, the level of trout fishing that occurs in the anadromous sections of LCMA tributaries is low. Based on professional judgment, we estimate a maximum of 1% of age 1 or older coho parr would be intercepted in trout fisheries. This estimate is used for all populations. Coho parr impacts are expected to be lower than steelhead, due to the small size of the juveniles and one year vs. 2 year average freshwater residency compared to steelhead parr.

Estimated tributary sport fishery harvest rates on marked hatchery coho were derived from catch record card-based sport catch and hatchery rack return data from the stream basins with both types of data available for the 2000-2003 return years. The average across all tributaries and years was 9.4 %, with a maximum of 35.5 % for one tributary (Cowlitz River, 2001). Harvest rates on natural coho in tributary sport fisheries in this region have been limited to incidental catch-and-release and drop-off mortality for several years, with estimated tributary harvest rates of less than 1 %, as discussed in greater detail in Section 2.1.3. All directed tributary sport coho fisheries are confined to the lower to middle mainstem reaches of the Grays, Deep, Elochoman, NF Lewis, Cowlitz, Toutle/Green, Kalama, Washougal, Big White Salmon, and Wind Rivers, so there are extensive refuge areas from sport angling for juvenile and/adult coho in the region in the tributaries to these streams, and the independent tributaries to the Columbia not open to coho angling.

Other sport fish seasons are set to maximize catch of bass, walleye, catfish, crappie, yellow perch, sunfish, whitefish, and northern pikeminnow, sturgeon, and carp. The steelhead and salmon handled in these fisheries are believed to be minor but no specific data exists for Lower Columbia River tributary catch. Data from creel surveys conducted from 1993-1996 in the area between Bonneville and McNary dams, and in 1994 between McNary and Priest Rapids dams show only 1% of steelhead were caught by non-salmonid anglers (James 1997). Based on creel surveys conducted in 1994 (James 1997), only 72 smolts (all species combined) were handled during April and May in the McNary Pool area. All other LCMA tributary fisheries are assumed to have less than 1% interception rate on listed stocks.

**1.4.1) Provide escapement objectives and/or maximum exploitation rates for each population (or management unit) based on its status.**

The LCFRB has completed a salmon and steelhead recovery plan for the Lower Columbia River ESU. Preliminary natural escapement objectives have been developed. Due to concerns about low spawner abundance WDFW has eliminated the direct sport harvest of adult natural origin coho salmon in these fisheries through the use of selective fisheries that require all anglers to release all wild coho salmon. In addition WDFW has used time and area closures to establish sanctuaries which are closed to fishing for these species.

Two sub-populations of coho in the LCR ESU are identified in the U.S. v. Oregon/Columbia River Compact management process, “Early” (Type S), and “Late” (Type N) coho. The main characteristics associated with each of these populations are that Type S coho are assumed to be more predisposed to an ocean migratory pattern to the south of the Columbia River mouth and have an earlier return timing, and Type N coho are assumed to have a more northerly ocean distribution than Type S and a later return timing. Type S coho often have different annual exploitation rates than the Type N coho as a result of the different regime of in-river regulatory actions designed to balance coho and chinook management objectives implemented early in the fall when the majority of Type S coho are present vs. management actions later in the fall when the majority of Type N coho are present. Management regimes for ocean fisheries off Oregon vs. Washington also impact Type S fish differently from Type N coho. These two populations are maintained via hatchery and stock transfer practices intended to keep the two populations as separate entities. However, the latest-timed Type N natural coho have not been propagated in the hatchery programs.

The dominant fishery impacts on these populations currently occur in marine sport and commercial troll fisheries off Oregon and Washington, and in-river sport and gillnet fisheries. Ocean and in-river coho management was traditionally focused on meeting hatchery rack return and hatchery management-based harvest rate objectives in the 1960s - 80s time period. The federal ESA listing of Oregon coastal coho, and Oregon origin lower Columbia coho by the state of Oregon subsequently resulted in a significant shift in coho management by the 1990s.

ODFW has conducted an extensive analysis of the stock - recruitment functions for two identified self-sustaining coho populations in the Lower Columbia coho ESU, the Sandy and Clackamas River populations, and developed a stepped exploitation rate management plan for these populations. A mortality rate limit for wild coho salmon caught in Columbia River fisheries is set annually prior to the time these fisheries open. In establishing this limit ODFW matches the parental escapement and index of survival for the upcoming adult return to a cell in the harvest matrix shown in Table 5 (ODFW, Portland, OR). Fishery managers from Oregon and Washington may set the fishery mortality rate at any level as long as it does not exceed the maximum limit of the associated matrix cell. To achieve these objectives in-river fisheries are shaped to target marked coho returns to the net pen release locations, and returns to the large tributary hatcheries.

**Table 5.** In-river harvest rate objectives for Oregon origin lower Columbia natural coho (source - ODFW, Portland OR)

Parental Escapement		Marine Survival Index (based on return of jacks per hatchery smolt)			
		Critical (<0.0008)	Low (< 0.0015)	Medium (< 0.0040)	High (> 0.0040)
High	> 0.75 full seeding	< 4.0%	< 7.5%	< 15.0%	< 22.5%
Medium	0.75 to 0.50 full seeding	< 4.0%	< 7.5%	< 11.5%	< 19.0%
Low	0.50 to 0.20 full seeding	< 4.0%	< 7.5%	< 9.0%	< 12.5%
Very Low	0.20 to 0.10 of full seeding	< 4.0%	< 6.0%	< 8.0%	< 10.0%
Critical	< 0.10 of full seeding	0.0 – 4.0%	0.0 – 4.0%	0.0 – 4.0%	0.0 – 4.0%

The PFMC pre-season ocean fishery planning process takes the annual exploitation rate objectives for the Sandy and Clackamas populations under advisement, though the PFMC has not been formally obligated to shape ocean fisheries to meet the exploitation objectives for these specific populations up to this point in time. The PFMC is required to minimize exploitation rates for federal ESA listed Coastal Oregon coho, which has also greatly reduced ocean exploitation rates for Columbia origin natural coho that are co-mingled in these fisheries. Due to these constraints ocean fishery exploitation has not been a major obstacle to meeting the exploitation objectives for Sandy and Clackamas coho to date. The suite of management initiatives to reduce natural origin coho exploitation rates in both regional ocean and the in-river fisheries have likely been providing similar protective benefits to other natural coho production from this region.

Since there are currently no identified self-sustaining natural coho populations in the Washington portion of the ESU, re-introduction/recovery harvest rate objectives will have to be developed through review of the Sandy and Clackamas coho population production functions and information from other coho populations outside the ESU. The hatchery coho programs have annual escapement objectives designed to maintain the viability of the programs, and both Ocean and in-river Columbia Compact fisheries are managed to meet the hatchery escapement objectives.

#### **1.4.2) Description of how the fisheries will be managed to conserve the weakest population or management unit.**

All LCMA tributary fisheries for coho salmon are selective. Resident fisheries are also selective with regard to their impacts to listed steelhead and salmon. These fisheries are closed during the migration of smolts from tributaries and require the release of all salmonids 8 inches or smaller, and 12 inches or smaller in mainstem tributaries. The implementation of selective fisheries allows

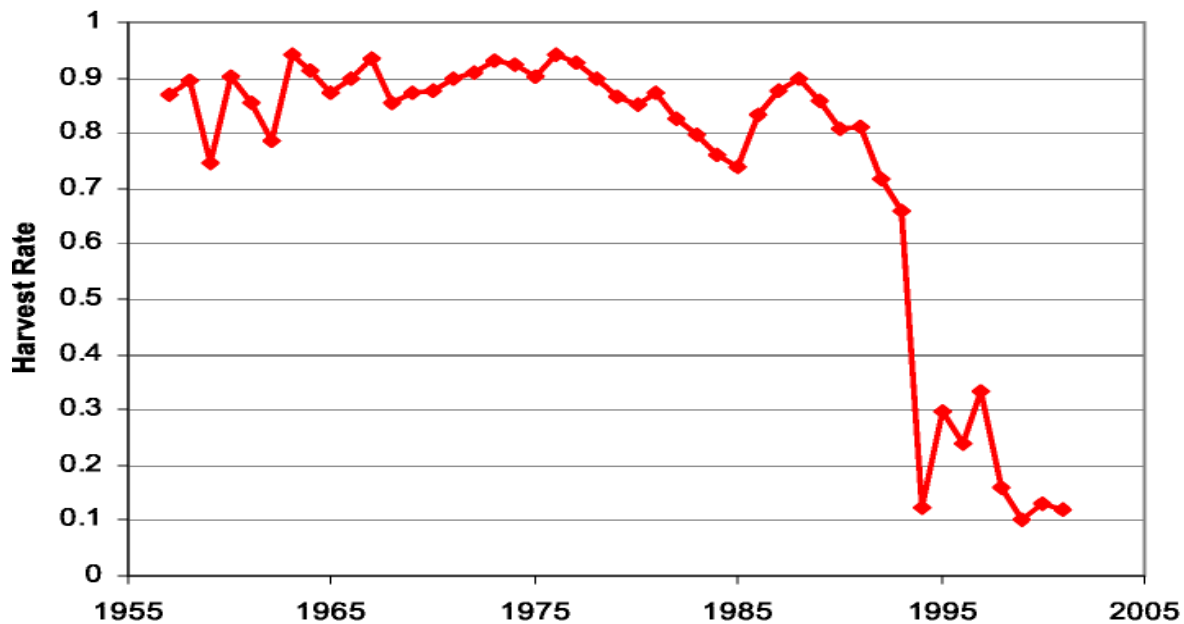
for WDFW to manage fisheries to protect the weakest stock. The harvest rates in selective fisheries are consistent with weak stock management. In regards to coho, WDFW feels the harvest controls that are currently annually implemented for conservation and rebuilding of the Sandy and Clackamas natural coho populations, and the absence of directed sport fisheries on natural origin coho in both the regional ocean and in-river fisheries should be an adequate interim protective framework for other natural coho production in the Lower Columbia region pending final development and implementation of re-introduction and recovery plans for natural coho across the entire ESU.

**1.4.3) Demonstrate that the harvest regime is consistent with the conservation and recovery of co-mingled natural-origin populations in areas where artificially propagated fish predominate.**

The WDFW has closed all tributaries to the harvest of wild coho salmon adults. Juvenile fall chinook and chum salmon are not intercepted in fisheries because their small size does not allow them to recruit to resident fisheries. In addition, the 8-inch minimum size in tributaries protects 100% of the juvenile coho salmon in these tributaries. It is illegal to harvest juvenile salmon in resident fisheries but if anglers do misidentify them as trout, the minimum size limit for trout protects more than 100% of the juvenile salmon from harvest.

The suite of ocean and in-river ocean and commercial fishery management actions taken to reduce the harvest of coastal Oregon and Sandy and Clackamas natural coho have had a very significant effect on reducing the total harvest rate of these coho stocks, as demonstrated by the summary of observed exploitation rates for Clackamas origin natural coho in Fig. 2. Other LCR populations have a slightly earlier return timing than Clackamas coho salmon and the harvest of these other populations in the lower Columbia River commercial fisheries may be slightly higher or lower, but WDFW fishery managers believe the trend in harvest shown for Clackamas coho is largely representative of the ESU harvest rate patterns on natural origin coho in the region. Until additional data is available Clackamas coho salmon harvest rates will be used as a surrogate for all wild coho populations in this ESU.

**Figure 2.** Clackamas River natural origin coho harvest rate (M. Chilcote, pers. comm, in NMFS 2003)



### 1.5) Annual Implementation of the Fisheries

#### WDFW Major year regulation cycle

Implementation of recreational fisheries outside the PFMC/North-of-Falcon and the Columbia River Compact processes is administered through the Washington Fish and Wildlife Commission. The sport rule adoption process is conducted on an annual basis. The ‘major year’ regulation cycle begins in the spring of the year, and involves solicitation from the public of recommendations for regulation changes. The public proposals are evaluated by department managers and technical staff to determine if they are consistent with the FMEP. Public meetings are held, and further public review and comments are solicited from the public and NMFS. At the end of the year, the Commission closes the public comment period and takes oral testimony from the public in an open meeting. In February of the following year, the Commission meets to adopt rules, and the public and NMFS are notified. Changes are effective May 1st annually, and notification to the public is incorporated into the State fishing pamphlet.

#### WDFW Minor year regulation cycle

The ‘minor year’ cycle regulations are amended through a separate, abbreviated process. Public proposals are not solicited, although WDFW staff may include recommendations from the public along with staff-generated proposals, commencing in early summer. In a “minor year” cycle,

proposals are evaluated by WDFW staff in September for compliance with the FMEP. In October, the stakeholders and NMFS are given the opportunity to comment on the accepted proposals. By December, the WDFW Director's office approves those proposals to be sent to the Commission. The Commission reviews the proposals, solicits public comments, takes written comment and holds a public hearing on the proposals in December. The Commission meets in February to adopt rules, the public is notified, and changes are incorporated into the State fishing pamphlet, effective May 1.

### **WDFW In-season regulation changes**

In-season changes to the adopted rules may be made, depending on changes in run sizes or other information, to further restrict the fishery for conservation needs or to expand a fishery when population status of the target species warrants, and when impacts to weak stocks can be minimized. The in-season modifications to the planned fisheries are promulgated by emergency rule changes under the State Administrative Procedures Act. In-season regulation changes are done in consultation with NMFS to ensure that changes are consistent with the FMEP.

### **U.S. v. Oregon/Columbia River Compact**

*U.S. v. Oregon*/Columbia River Compact fisheries are not discussed in this FMEP, but the Technical Advisory Committee impact assessments are evaluated through Section 7/10 consultation process. Commercial fishery seasons on the portion of the mainstem Columbia River where the states of Oregon and Washington share a common boundary are regulated by a joint Oregon and Washington regulatory body (the Columbia River Compact). The ODFW and WDFW directors or their delegates comprise the Compact and act consistent with delegated authority by the respective state commissions. Columbia River seasons are also regulated by the *U. S. v. Oregon* process which dictates sharing of Columbia River fish runs between treaty Indian and non-Indian fisheries. The Compact receives input from the tribes, states, the federal government, and the fishing industry through a series of meetings held throughout the year. These meetings assist the Compact in developing harvest allocations and decisions related to monitoring harvest quotas. Meetings are held in late January of each year to establish the harvest guidelines for the spring and summer fisheries and in late July to establish guidelines for fall fisheries.

### **PFMC/North-of-Falcon**

PFMC/North-of-Falcon fisheries are not discussed in this FMEP, but are evaluated during the annual pre-season planning process for ocean fisheries and authorized through Section 7 consultation. Except where specifically authorized, according to the management framework developed within the annual Pacific Fishery Management Council/North of Falcon (PFMC/North-of-Falcon) agreements, salmon fisheries are closed. The PFMC/North-of-Falcon process includes the analysis of impacts to salmon stocks of concern, including those listed under ESA. Preseason planning for Columbia River fisheries occurs during the North-of-Falcon process. Ocean sport, commercial, and tribal fisheries are heavily influenced by the abundance of Columbia River salmon stocks, and season structures in ocean fisheries must take into account the needs of the fisheries in the mainstem Columbia River and tributaries. During this process harvest rates for LCR tule fall chinook and coho are developed that will affect fall chinook and coho fisheries in the LCMA tributaries.

## SECTION 2 EFFECTS ON ESA-LISTED SALMONIDS

### 2.1) Description of the biologically-based rationale demonstrating that the fisheries management strategies will not appreciably reduce the likelihood of survival and recovery of the affected ESU(s) in the wild.

Fishing rates identified in this plan do not appreciably reduce the likelihood of survival and recovery of wild coho salmon. WDFW proposes that the harvest rate objectives that are currently annually implemented for conservation and rebuilding of the Sandy and Clackamas coho populations should be an adequate protective framework for natural coho production in the Lower Columbia region pending development of re-introduction and recovery plans for natural coho production for other stream basins in the region. Assuming the 10-30 % exploitation rates observed for Clackamas R coho since 1994 are representative of the exploitation rates occurring on other natural coho production in the region, these rates should be adequate for implementing successful recovery/re-introduction actions for populations elsewhere in the ESU.

WDFW is using exploitation rate objectives for Puget Sound region natural coho populations of 50-60 % for stocks experiencing an average productivity regime, 30-40 % for low productivity periods, and 10 % for critical abundance levels. WDFW currently has no directed tributary fisheries for natural origin/unmarked coho downstream of Bonneville Dam, so all tributary sport fisheries should only have a small incidental release mortality impact, and this only on the tributaries open to coho angling (Grays, Deep, Elochoman, Cowlitz, Toutle, North Fork Lewis, Kalama, Washougal). The Big White Salmon and Wind Rivers have been transitioned to mark selective regulations in the fall of 2005. A very low level of release mortality may also occur during the winter steelhead fisheries in these tributaries, and in other tributaries that are open to winter steelhead angling but not salmon fishing.

#### 2.1.1) Description of which fisheries affect each population (or management unit).

There is potential that any fishery may affect any of the listed populations within the ESU. However, due to fishery management regulations including time, area, and gear restrictions, WDFW has largely been able to restrict harvest impacts to the target species. We have identified three fisheries in which the target fishery has potential to affect non-targeted listed stocks: 1) targeted chinook fisheries may have some impacts on chum, coho, and steelhead, 2) targeted steelhead fisheries may impact chinook, coho, and chum stocks, and 3) targeted trout fisheries may impact juvenile steelhead and coho stocks (Table 6).

**Table 6.** Fisheries likely to affect wild coho salmon stocks in the LCMA.

Coho Stock	Trib Winter Steelhead	Trib Summer Steelhead	Trib Spring Chinook	Trib Fall Chinook	Trib Coho	Trib Res. Fish
Grays	X			X	X	
Skamokawa	X					
Elochoman	X			X		
Mill	X					
Abernathy	X					
Germany	X					
Cowlitz	X	X	X	X	X	

Coho Stock	Trib Winter Steelhead	Trib Summer Steelhead	Trib Spring Chinook	Trib Fall Chinook	Trib Coho	Trib Res. Fish
Coweeman	X					
NF/Main Toutle	X	X		X	X	
SF Toutle	X	X				
Green	X	X				
Kalama	X	X	X	X	X	
NF Lewis	X	X	X	X	X	
EF Lewis	X	X		X	X	
Salmon	X			X		
Washougal	X	X	X	X	X	
Bonneville						
Klickitat		X	X		X	

### **Steelhead and Salmon fisheries -**

Wild coho salmon can be encountered in late season summer steelhead and early season winter steelhead fisheries. However, they are largely protected by wild coho release regulations. WDFW statewide rules declare that salmon fisheries are closed unless otherwise specified in Special Rules. Depending on adult salmon return strength WDFW promulgates regulations allowing spring chinook, fall chinook, and coho salmon fisheries in lower Columbia River tributaries. Recreational salmon fisheries are typically open January through July in streams containing spring chinook runs. Streams with fall-run chinook are typically open from August through December. Coho fisheries typically overlap fall-run chinook fisheries in the LCMA. Salmon-directed fisheries will vary from year to year and from stream to stream depending on the health status of salmonid populations and run-size forecasts for each particular stream.

The WDFW defines adult chinook salmon as 24 inches in length or longer and coho as 20 inches in length or longer. Pink, chum, or sockeye are considered adults at 12 inches or longer. Daily limits may vary from stream to stream. Once the daily bag limit has been retained it is illegal to continue to fish for salmon. As populations change WDFW management strategies will change with them. Limits and regulations may change from year to year or stream to stream. In-season adaptive fishery openings and emergency closures may occur throughout a season. Decisions for fishery rule changes are based on run-size forecasts for a particular year. Fishery openings or closures may be proposed at any time during a fishery season based upon harvest opportunities and conservation needs. In-season fisheries changes are designed to maximize harvest opportunities while meeting harvest impacts limits identified in this FMEP. The NMFS will be consulted as part of this process.

Coho salmon are encountered in tributary fall chinook fisheries from August through January. In years with few spawners, tributary fall chinook fisheries have been reduced to ensure hatchery and wild fall chinook escapement goals are met. Coho salmon impacts during targeted fall chinook fisheries are believed to be low. Fishing in tributaries is closed to chum salmon, therefore no coho salmon are impacted by the chum salmon fishery.

Fisheries for adipose fin-clipped hatchery coho salmon destined for the Grays, Deep, Elochoman,

Cowlitz, Toutle, Kalama, Lewis, and Washougal, and for both non-ad clipped and ad clipped coho in the Big White Salmon and Wind Rivers occur from August through January in most years (angling is open year around for coho in some of those streams, depending on if steelhead and/or spring/summer chinook fisheries are open or not in each stream in a given year). These coho fisheries do not encounter adult spring chinook, which have all passed into upstream spawning areas or have died by this time. Wild steelhead and chum salmon are protected in these fisheries by wild steelhead and salmon release regulations.

In recent years the Wind River and Big White Salmon fisheries have not been mark-selective fisheries, due to the high proportion of unmarked hatchery origin coho returning annually above Bonneville Dam, and because only very limited natural coho smolt production has been observed during smolt trapping operations in the Wind basin, and small numbers of unmarked adult coho have been captured in the Wind during adult salmonid trapping operations (D. Rawding, WDFW pers. comm). The Big White Salmon is also assumed to have minimal natural coho production, due to the limited coho spawning and rearing habitat. These fisheries, however have been changed to selective fisheries in the fall of 2005 to provide consistent protection for natural coho production in the entire ESU.

### **Resident Trout -**

The WDFW has established statewide rules for trout fisheries designed to provide recreational angling while at the same time protecting wild salmon and steelhead populations. Trout fisheries are generally scheduled from June through October in rivers, streams, and beaver ponds, and year-round in lakes, ponds, and reservoirs, unless otherwise specified in Special Rules. Trout fisheries incorporate minimum size restrictions designed to protect juvenile salmonids. There is a two-fish daily limit and an eight-inch minimum size restriction in tributary areas. Mainstem rivers open for trout fishing are regulated to afford additional protection with 12-inch or 14-inch minimum retention sizes applied to the two-fish daily bag limit. All wild steelhead and bull trout/Dolly Varden must be released year-round, except as specifically exempted in Special Rules.

Selective gear restrictions are imposed in areas to promote catch and release opportunities or where fish populations are depressed. Where these restrictions are imposed will vary from year to year, depending on the current status of fish populations. These restrictions allow only the use of unscented artificial flies or lures with one barbless single hook, prohibit the use of bait, and fish may be released until the daily limit is retained. Selective gear restrictions also prohibit anyone from fishing from any floating device equipped with a motor, except where specifically allowed under Special Rules for individual waters. Non-buoyant lure and night fishing restrictions are imposed in specific waters to prevent illegal snagging.

Fisheries for resident trout take place in tributaries and standing waters throughout the LCMA. Plants of hatchery-reared trout for put-and-take fisheries have been restricted to standing waters, streams above the anadromous zone, and streams above dams on the Lewis and Cowlitz rivers to minimize impacts on steelhead and salmon smolts. These plants and fisheries now occur above or in the same reservoirs whose dams block historic salmon migrations. In addition, hatchery-reared sea-run cutthroat trout are released in the Cowlitz River to mitigate for the construction of

Mayfield and Mossyrock dams.

Trout fisheries have the potential to impact most listed juvenile salmonids. However, WDFW has implemented time and area restrictions, which greatly reduce potential impacts. The general statewide trout season is open from June 1 to October 31. Trout fishing is closed in the lower Columbia tributaries during the smolt outmigration. The WDFW and other agencies have operated juvenile out-migrant traps in LCMA tributaries to determine the timing of the wild coho salmon smolt outmigration. In all years wild migration increased in April, peaked in May, and is concluded in June. The WDFW has five basins open to angling during the spring smolt outmigration. These include the Cowlitz, Kalama, Lewis, Washougal, and Wind watersheds. In all these basins a significant hatchery spring chinook or hatchery summer steelhead fishery is present. All are closed to trout fishing and have a 20-inch minimum size limit to eliminate resident trout-directed fishing during this period.

In addition to the spring closure to protect smolts WDFW has an eight-inch minimum size and a daily two-fish limit in all streams, with at least a 12-inch minimum and a two-fish limit in larger mainstems. The direct harvest of juvenile salmon is prohibited in freshwater. However, WDFW recognizes that juvenile salmon caught by anglers may be misidentified as trout. As long as anglers follow the eight-inch minimum size for trout, all wild salmon juveniles will be protected from direct harvest. Wild coho and spring chinook smolts remain in freshwater for only one year compared to steelhead that rear for two or three years in the freshwater. Due to this reduced freshwater residency, coho salmon smolts are smaller than the steelhead smolts, and 100% would be less than the eight-inch minimum size used for trout and steelhead protection for trout.

#### **Other Resident Fish Species -**

Fisheries for other species may occur year-round within the LCMA or concurrent with salmon and steelhead seasons. Many of these fisheries, however, are concentrated after the spring runoff when flows and warm water temperatures permit successful angling. Targeted species include whitefish, walleye, and other warm water species, such as largemouth and smallmouth bass. Selective gear requirements are imposed on some tributaries within the LCR, while angling for any fish species.

Fisheries occur in the lower sections of some LCR tributaries for warm water game species including largemouth bass, smallmouth bass, channel catfish, crappie, bluegill, carp, and northern pikeminnow. The whitefish fishery is not significant in the LCR and no specific regulations or special seasons are implemented. Warmwater fisheries also occur in standing waters throughout the basin. Chinook, chum, and steelhead impacts in warm water fisheries are nil. In the LCR tributaries, warm water fisheries are concentrated in backwaters and sloughs, which are not hospitable rearing areas for juvenile salmonids. Chinook, chum, and steelhead are not present in standing waters where warm water fisheries occur. Fisheries are also most active during warm summer months after spring migrant juvenile chinook and chum have left the system and before fall migrant juvenile chinook disperse downstream from rearing areas. Since warm water species potentially prey on and compete with juvenile salmonids, warm water fisheries could actually provide some marginal benefit for listed salmon and steelhead if the warmwater catch were significant.

The WDFW manages the commercial carp fishery as closed unless otherwise opened by a WDFW-approved license request for a fisher. Upon request of a commercial carp license, WDFW will evaluate the potential impacts of the fishery on ESA listed species, the resident biotic populations of the specific water, and cumulative impacts. If the license request is approved, the specific water body is opened to a commercial carp fishery for the license holder. The season for commercial carp fishing is open year-round for license holders. However, the majority of the fishing and catch occur between February and May (S. Jackson, WDFW pers comm.).

Gears allowed for use in the commercial carp fishery are trammel and beach seine nets. Applicants must specify which gear type will be used. Trammel nets are required to have an inside net (webbing) with a maximum stretch mesh size of 7 inches, measured diagonally, and a minimum stretch mesh of the outside net (wall) of 12 inches, measured diagonally. Beach seine nets can have a maximum stretch mesh of 2 inches, measured diagonally. While fishing either gear type, nets must be within sight of licensed fisher and must be pulled at least every two hours.

The WDFW regulates the mesh size and duration nets can be set during commercial carp fisheries to limit incidental salmonid by-catch and maximize by-catch survival. The mesh size of trammel nets allows smolt size fish to swim through without impeding passage, while adults are readily captured. The design of the trammel nets holds adult fish by tangling them in the nets by fins, teeth, jaw, or opercle. The opercle are not compressed closed, as with gill nets, and fish can continue to breathe while tangled in the nets. Limiting the duration (two hours) nets can be deployed improves the likelihood for incidentally caught fish to survive after release.

The fishery will be monitored by harvest logs. The WDFW requires all fishers participating in the commercial carp fishery to report total catch of carp and all fish by-catch on harvest logs. The harvest logs are to be returned to the WDFW by the 10<sup>th</sup> of each month following issuance of a permit. This is a monthly requirement regardless of fishing activity. Failure to comply with these reporting requirements will result in revocation of current licenses and any eligibility for a commercial carp license for 12 months.

#### **Other anadromous species -**

Shad fisheries are opened in the LCMA tributaries and the fishery effort is believed to be low. Shad fishing occurs from May through July. A smelt fishery occurs in the lower mainstem Columbia River and Washington tributaries. Under permanent regulations, the commercial smelt fishery operates seven days per week from December 1 through March 31 in the Columbia River. However, the season has been reduced or replaced with a test fishery since 1995 because of recent poor returns. Gear includes small otter trawls, gill nets with a maximum of two-inch mesh size, and hand dip nets. These fishery do not affect salmon or steelhead adults or juveniles. Tributary smelt fisheries are limited to dip nets and the most significant fishery occurs in the Cowlitz River. The few adults present during this time easily avoid the gear. Juvenile salmon are not migrating at the times and places smelt fisheries occur.

#### **2.1.2) Assessment of how the harvest regime will not likely result in changes to the biological characteristics of the affected ESUs.**

Low harvest impact rates which will result from implementation of selective fisheries for adipose fin-clipped salmonids will minimize the potential for fishing-related changes in biological characteristics of salmon and steelhead populations. Fishing impacts on coho salmon are small and spread over the breadth of the run so that no subcomponent of the wild stock will be selectively harvested at a rate substantially larger than any other portion of the run. No significant harvest differential will occur for different size, age, or timed portion of the run. Since all fish are required to be released, there is no selection in the fishery for size, sex, or age. In addition, low harvest rates for wild fish will maintain or increase the number of wild spawners even in periods of poor freshwater migration and ocean survival conditions. Larger populations will be less subject to genetic risks and loss of diversity associated with small population sizes. Finally, increased harvest rates of hatchery fish in selective fisheries should benefit wild stock integrity and diversity by removing a greater fraction of the hatchery fish which could potentially stray into wild production areas. All tributary fishery impacts to natural coho are currently only the result of indirect sources of mortality (catch-and-release mortality, illegal harvest), and only a limited portion of the total tributary habitat in the ESU is open to coho angling so the effect to natural production from the sport fisheries should be minimal.

### **2.1.3) Comparison of harvest impacts in previous years and the harvest impacts anticipated to occur under the harvest regime in this FMEP.**

Coho sport fisheries in lower Columbia tributaries are managed to maximize the harvest of hatchery origin coho, while minimizing the incidental harvest of natural origin coho through the use of mark-selective fisheries. A long-term comparison of total exploitation rates for Clackamas natural coho (Fig. 2, Section 1.4.3) indicates exploitation rates were above 70% from 1955 through the late 1980's, but were reduced to less than 30% and often towards 10% by the 1990s. Table 7 summarizes the estimated tributary harvest rates for Lower Columbia hatchery coho for the 2000-2003 return years for the major tributary sport fisheries (Grays, Elochoman, Cowlitz, Toutle, NF Lewis, Kalama, Washougal). These rates were calculated by dividing the sum of the reported sport catch by the sum of the sport catch and hatchery rack return<sup>2</sup>. An additional 5 % was added to the reported sport catch values to account for drop-off mortality, per the rate used for Retention Freshwater Recreational fisheries in FRAM modeling (Model Evaluation Workgroup, 2004). Since all wild coho salmon are released, tributary sport harvest rates for unmarked coho are much less.

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<sup>2</sup> CWT recovery analysis cannot be used to estimate tributary sport fishery exploitation rates, due to the relatively small scale and limited sampling and tag recovery rates for most of these fisheries.

**Table 7.** Tributary coho sport fishery wild coho non-retention mortality estimates for 2000 -2003 <sup>1</sup>

River	Return year			
	2000	2001	2002	2003
Grays	6.7%	2.0%	1.7%	2.3%
Elochoman	8.6%	11.9%	5.3%	8.5%
Cowlitz	16.7%	35.5%	12.8%	14.9%
Toutle	0.0%	1.2%	10.1%	4.2%
Kalama	14.9%	17.1%	13.7%	15.0%
NF Lewis	16.0%	14.3%	8.6%	9.1%
Washougal	2.6%	3.1%	0.9%	5.3%

Notes

1: Includes 5 % “drop-off” mortality

All Washington tributary coho sport fisheries downstream of Bonneville Dam have been under selective fishery regulations (no retention of unmarked coho) since 1998, so the only tributary sport mortality on unmarked coho in this region has been from catch-and-release encounters or illegal harvest. The estimated number of natural origin coho mortalities that occurred in tributary sport fisheries as a result of release encounters are summarized in Table 8. Since there are no estimates of natural origin coho runsize currently available for Washington tributaries, an assumption was made that the natural runsize in each of the tributaries that are open to sport fishing is 10% of the hatchery runsize, based upon the estimate that “less than 10%” of the current Columbia coho run consists of natural origin coho (WDFW and ODFW 1999). An encounter rate for the unmarked/natural origin coho runsize estimates matching the hatchery coho exploitation rates was then assumed, and a non-retention mortality rate of 10% was applied to the estimates of encounters to derive the sport fishery related mortality estimates of coho in each of the tributaries open to coho angling, per the rate used for release mortality in Non-Retention Freshwater Recreational fisheries in FRAM modeling (Model Evaluation Workgroup, 2004). No estimate of illegal harvest is available at this time.

**Table 8.** Tributary coho sport fishery **wild coho non-retention mortality estimates for 2000 -2003**

River	Return year			
	2000	2001	2002	2003
Grays	9	1	0	0
Elochoman	11	26	7	10
Cowlitz	98	396	110	54
Toutle	0	2	24	13
Kalama	19	66	15	14
NF Lewis	76	163	22	58
Washougal	2	7	2	3
Total	214	661	180	153

The expected take of listed coho stocks in the LCMA during tributary fisheries is illustrated in Table 9.

**Table 9.** Estimated take of listed coho salmon in various fisheries.

Affected Stock	Fisheries									
	Steelhead		Salmon		Resident Trout		Other (eg. whitef/wmwtr)		Harvest	Total Take <sup>3</sup>
	AE <sup>1</sup>	EM <sup>2</sup>	AE	EM	AE	EM	AE	EM		
Grays River	<1%	<1%	3.2%	0.3%	0	0	0	0	0.3%	0.3%
Elochoman River	<1%	<1%	8.6%	0.8%	0	0	0	0	0.8%	0.8%
Coweeman River	<1%	<1%	0.0%	0.0%	0	0	0	0	0.0%	0.0%
Toutle River	<1%	<1%	3.9%	0.4%	0	0	0	0	0.4%	0.4%
Cowlitz River	<1%	<1%	20.0%	1.9%	0	0	0	0	1.9%	1.9%
Kalama River	<1%	<1%	15.2%	1.5%	0	0	0	0	1.5%	1.5%
Lewis River	<1%	<1%	12.0%	1.1%	0	0	0	0	1.1%	1.1%
Washougal River	<1%	<1%	3.0%	0.3%	0	0	0	0	0.3%	0.3%
Wind River	<1%	<1%	<1%	<1%	0	0	0	0	<1%	<1%
Little White Salmon River	<1%	<1%	<1%	<1%	0	0	0	0	<1%	<1%
Salmon Creek	<1%	<1%	<1%	<1%	0	0	0	0	<1%	<1%

Notes:

<sup>1</sup> Anticipated Encounters (AE) are catch and released fish. These numbers represent the number of fish from a stock anticipated to be incidentally encountered by anglers of a particular fishery.

<sup>2</sup> Expected Mortality (EM) is the hooking mortality of incidentally caught fish, based on (WDFW 2000). Expected mortalities are included in Anticipated Encounters in terms of take.

<sup>3</sup> Total take encompasses Anticipated Encounters and expected recreational harvest. This can be construed as the harvest rate.

#### **2.1.4) Description of additional fishery impacts not addressed within this FMEP for the listed ESUs specified in section 1.3. Account for harvest impacts in previous years and the impacts expected in the future.**

Lower Columbia origin coho are caught in both ocean and in-river sport and commercial fisheries. Natural origin coho experience only incidental mortalities in sport fisheries since the implementation of mark-selective sport coho fisheries in all Washington and Oregon ocean sport fisheries, and all Columbia in-river sport fisheries downstream of Bonneville Dam. Figure 3 summarizes the total fishery exploitation rate estimates observed for coded wire tagged and adipose clipped hatchery coho from the 1992 to 2000 brood years for the Cowlitz Type N, North Fork Lewis Type S and Type N stocks, and Toutle Type S stock, and the non-adipose clipped Type S and Type N “double indicator” (DIT) Lewis Hatchery releases. Total exploitation rates are based upon the sum of age 3 fishery recoveries divided by the sum of age 3 fishery and escapement CWT recoveries. These data are not adjusted for non-landed mortalities or unsampled straying. If more than one CWT code was released for a brood year from a hatchery facility, the release and recovery data were pooled prior to calculating the exploitation rates. Not all hatchery fish return to these facilities and the RMIS database does not include hatchery fish that spawn naturally. Therefore, exploitation rates based on this analysis are likely biased high. Using the double index group of Lewis River Type S coho as a surrogate wild coho salmon, the total exploitation rate for 1995 to 2000 averages about 5%. When the Lewis River double index group for Type N, coho is used as a surrogate for wild coho the average exploitation rate is ~40%, with most of these impacts resulting from non-selective commercial fisheries.

**Figure 3.** CWT recovery based age 3 fishery exploitation rate estimates for Cowlitz Type N, Lewis Type N and Type S, and Toutle Type S (data from PSMFC RMIS database, May 18, 2005)

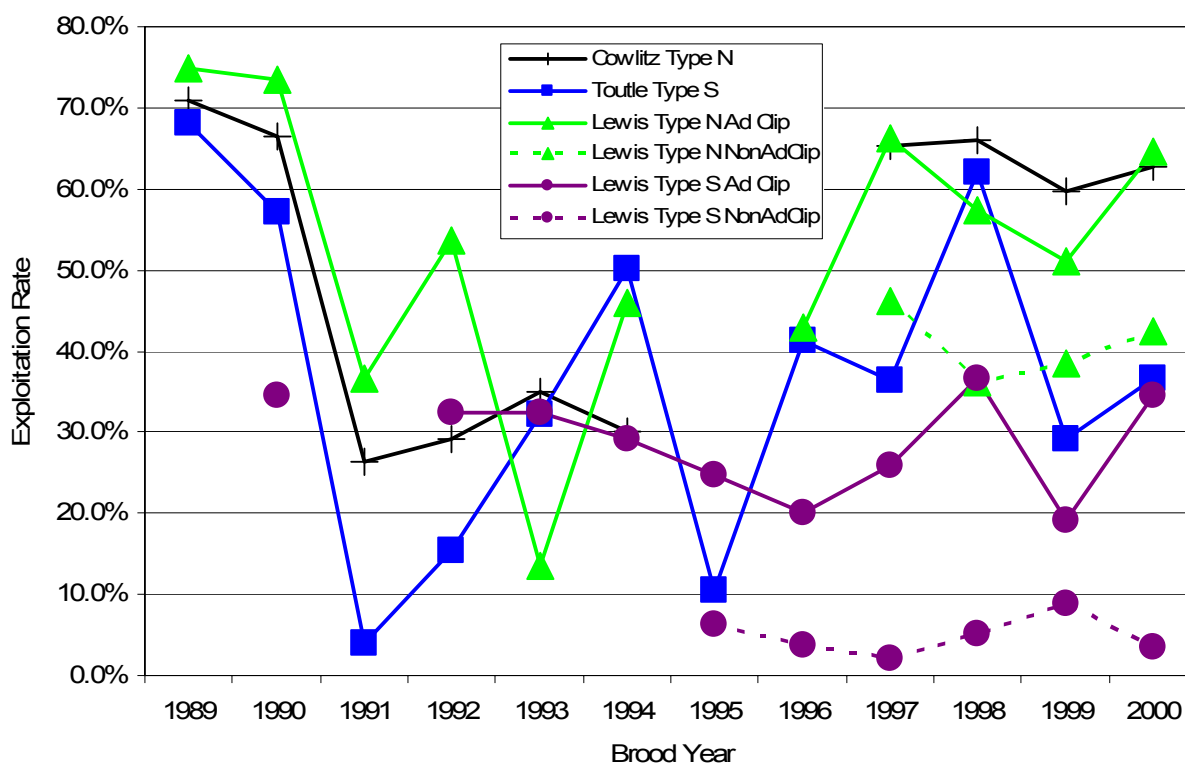


Figure 3 illustrates the differential exploitation rates that often occur between Type S (early return timing) and Type N (late return timing) coho stocks, and also illustrates the significantly lower exploitation rates for the non-adipose clipped DIT CWT groups than the associated ad clipped CWT releases from each hatchery facility. The majority of fishery mortalities for the DIT non-ad marked release groups are from in-river net fisheries, with some additional recoveries in ocean troll fisheries. Figure A-1 (appendix) provides a detailed CWT code-specific summary of age 3 recoveries by major fishery groupings for the hatchery facilities summarized above (data from RMIS Website, 05-18-2005).

The exploitation rate pattern for Columbia natural coho populations in 2005 and beyond are expected to follow the levels observed since 1994 for the Clackamas natural coho population summarized in Fig. 2, although the absolute rates for each population will vary above or below

the Clackamas indicator depending on watershed location and stock-specific return timing, which will affect exposure to fisheries. The exploitation rate pattern for the latest timed natural coho in Washington watershed should closely follow the exploitation rate pattern of Clackamas Late coho and be significantly less than the exploitation rate pattern for the earlier timed non-ad marked Lewis River Hatchery Type N coho. The majority of the later timed natural origin Type N coho enter the Columbia River in November and December after the coho gillnet fishery is closed for the season. The same, or more conservative regulatory actions that resulted in the observed exploitation rates in Figure 2 will continue to be in place in both the PFMC ocean fishery management process and the in-river Columbia River Compact process, and the new federal ESA listing of Columbia coho will likely result in further efforts by the fishery managers to reduce natural coho exploitation rates.

## **SECTION 3 MONITORING AND EVALUATION**

### **3.1) Description of the specific monitoring of the “Performance Indicators” listed in section**

Performance indicators for wild LCMA salmon include fish population indicators and fishery indicators. Since the objective of this FMEP is to provide fishing opportunity consistent with the recovery of listed species and at rates that do not jeopardize their survival or recovery, the primary indicators for this FMEP are the abundance and productivity of wild salmon and steelhead stocks.

#### **Abundance and productivity**

The current natural coho population indicators for are juvenile and/or spawning escapement estimates for 6 coho populations. Our first priority is to choose streams that have a weir or trap so that observation or measurement error can be minimized and/or quantified. Stream indexes include a variety of salmonid populations, are representative of the habitat within the ESU, and dispersed across the ESU. New escapement monitoring has been initiated at Germany, Mill, and Abernathy Creeks starting in the fall of 2004, along with ongoing escapement monitoring at Cedar Cr., the Cowlitz River barrier dam fish trap, and the NF Toutle Sediment Retention Structure (Table 10). Some escapement monitoring is also occurring on the Grays, Elochoman, and Skamokawa Rivers.

**Table 10.** Key steelhead & salmon monitoring sites in the Lower Columbia River ESU with current funding.

Basin	Stock	Adult Monitoring	Smolt Monitoring	Adult Esc. Method	Comments
Cowlitz above Cowlitz Falls	Coho	Barrier Dam	Cowlitz Falls Dam	Total Fence Count	Population in upper watershed & Tilton extirpated, re-introduction effort
NF Toutle River	Coho	Fish Collection Facility	Intermittent	Total Fence Count	Population recovering after eruption of Mt. St. Helens
Cedar Creek	Coho	Grist Mill Ladder	Grist Mill Ladder	Fish Ladder Index	Historically, a coho stream with a small fall chinook, steelhead & cutthroat run
Wind /Kalama Rivers	Coho	Falls Ladder	Screw Traps	Fence Count	Steelhead streams, few Coho present
Grays/ Elochoman/ Skamokawa Rivers	Coho	Live & Redd Counts	None	In development	SAFE program surveys to recover CWTs
Abernathy/ Mill/ Germany	Coho	Redd counts	Screw trap	Redd expansion	Intensively Monitored Watershed Program. Abernathy Creek has floating weir

Annual adult passage counts above the Elochoman River Hatchery weir are also available each year, though high flows and/or other operational issues can often preclude a complete census of fish passing upstream of the structure.

### **Outmigration studies -**

Juvenile out-migrants are monitored in Mill Creek, Abernathy Creek, Germany Creek, Cowlitz Falls Dam, Mayfield Dam, Coweeman River, Kalama River, Cedar Creek, and Wind River. Few coho salmon are observed in the Wind and Kalama River. It is expected that monitoring would continue at all sites except the Coweeman River, which was only funded in 2005. Rotary screw traps are at all sites except the dams, where bypass facilities are used. Out-migrant estimates are developed using a Petersen estimator based on the trap efficiency method. Intermittent juvenile production monitoring has been conducted in the NF Toutle and EF Lewis basins, but annual funding for these is not available.

WDFW is aggressively pursuing additional resources to develop a comprehensive coho salmon monitoring plan. For a more detailed description of monitoring methodology for adult surveys, CWT marking, genetic evaluations, fish health evaluations, and fisheries monitoring see the original FMEP.

### **3.2) Description of other monitoring and evaluation not included in the Performance**

### **Indicators (section 3.1) which provides additional information useful for fisheries management.**

In addition to routine monitoring and evaluation activities described above, WDFW also collects or uses information from other sources related to the status of listed salmon and steelhead and the implementation of fisheries which might affect them. Since freshwater habitats are linked to wild steelhead and salmon production WDFW monitors habitats through the Salmon and Steelhead Habitat Inventory and Assessment Program (SSHIAP), and hydraulic permit reviews. These data may be useful in forecasting salmon and steelhead runs, because they can quantify changes in habitat productivity. This includes information on habitat improvement projects that open historic habitat, or documentation of natural compensatory processes. Finally, extensive monitoring and evaluation activities are conducted for chum salmon, chinook salmon, and steelhead at local hatcheries. This program inventories production and returns, tracks straying, monitors fish health, and relates return rates to hatchery practices.

### **3.3) Public Outreach**

The popularity of the steelhead and salmon fisheries result in intense public interest and participation in the annual management processes for these species. The WDFW conducts extensive public involvement and outreach activities related to salmon and steelhead fishery management and recovery. The annual fishery regulation process involving a series of public meetings, information mail-outs, press releases, and public hearings was described in detail in section 1.5. Anglers are keenly aware of and accustomed to abrupt in-season management changes including closures and re-openings with short notice. Permanent regulations are detailed in published pamphlets of fishing regulations. Annual regulation and in-season changes are widely publicized with press releases, phone calls or faxes of action notices to key constituents, and signs posted at fishery access points. The WDFW also operates an information line, a recorded hotline, and an Internet web page where timely information is available.

In addition to fishery-related outreach efforts, the state of Washington is conducting a broad-based watershed recovery effort coordinated through the Lower Columbia Fish Recovery Board (LCFRB). The LCFRB is developing a salmon and steelhead recovery plan for the LCR region in conjunction with federal, state, and local governments and concerned citizens.

### **3.4) Enforcement**

Sport fishing regulations in Washington are enforced by the Enforcement Program of the WDFW. The Fish Management and Enforcement programs work together to develop enforceable regulations to achieve fish and wildlife resource management goals. The Region 5 Enforcement program for the LCR includes one captain, three sergeants, and 13 enforcement officers. Although Klickitat County is within Region 5, it is outside the coverage of this plan. Enforcement activities in the LCR are conducted from offices in Vancouver and Cook, and are responsible for enforcement of state fish, wildlife, and habitat regulations in the area covered by this plan. The highest enforcement priority for fish is protection of endangered species, which includes monitoring LCR tributary and mainstem Columbia River fisheries for compliance.

The WDFW Enforcement and Fish programs work together to facilitate enforcement of resource management goals through a monthly cooperative enforcement planning process where local sergeants and officers meet monthly with local biologists at the district to set enforcement priorities by fish species. Sergeants then develop 28-day plans to address priority issues and gain desired compliance levels to protect resources and meet management goals. The results of each 28-day plan are quantified and compared to the compliance level considered necessary to meet management goals. Compliance is typically estimated based on the percentage of angler contacts where no violations are noted. The 28-day plans are adjusted if necessary based on compliance assessments to make the best use of limited resources in manpower and equipment to achieve the goals.

Fisheries are assigned a high priority for enforcement and are intensively monitored. Officers are assigned to work during open fishing days and restrictive seasons, with additional checks during closed periods. Officers conduct bank and boat patrols to check and assist anglers. Covert surveillance is also made in locations where complaints on violators have been received. The current enforcement database tracks hours worked, angler contacts, warnings, and citations by officer by fishery. The database differentiates fisheries by location (mainstem Columbia versus tributary, or within tributaries Cowlitz versus Lewis), or salmon (chinook versus coho versus chum). Summary compliance reports are available for these fishery activities but have not been compiled except for a draft compliance report to measure how well anglers were complying with Wild steelhead release fisheries. The WDFW enforcement staff conducted a statewide angler compliance survey in 1992 and 1993 in waters that were open to fishing under wild steelhead release or catch and release regulations. A total of 4,879 anglers was contacted. The anglers had retained 351 steelhead. A total of six wild steelhead were retained, providing a compliance estimate of 98.6% (Hahn 1997). To improve compliance monitoring, WDFW is designing a study, which will focus on particular sites over time. This program will include enforcement and non-enforcement components.

### **3.5) Schedule and process for reviewing and modifying fisheries management.**

#### **3.5.1) Description of the process and schedule that will be used on a regular basis (e.g. annually) to evaluate the fisheries, and revise management assumptions and targets if necessary.**

Wild population status and fishery performance will be assessed annually by WDFW and a report will be provided to NMFS. The annual fishery review process described in detail in Section 1.5 will continue to be employed to evaluate fisheries and revise management assumptions and targets as needed. To ensure that fish populations and fishery management is meeting the goals described in this plan, annual monitoring will include wild fish escapement numbers and/or indices, cohort replacement rates, projected future wild and hatchery numbers based on age composition of recent returns, fishery harvest of hatchery fish and handle of wild fish, fishery effort, fishery catch per unit effort, mark rates in the fishery and escapement areas, and projected fishery impacts on wild fish.

The WDFW used Recovery Exploitation Rates for index population(s) because sufficient data

was not available to estimate Recovery Exploitation Rates for each population. With the monitoring program outlined in this FMEP, WDFW will collect the data required to develop additional population specific Recovery Exploitation Rates. Critical and viable thresholds for each population have not yet been established, and instead WDFW used Recovery Exploitation Rates in this FMEP. WDFW will work with the TRT, LCFRB, and NMFS to develop estimates of critical and viable thresholds and incorporate these thresholds into this fishery analysis. The WDFW will produce a report annually on the status of chum, chinook, and steelhead in the LCR.

**3.5.2) Description of the process and schedule that will occur every 5 years to evaluate whether the FMEP is accomplishing the stated objectives. The conditions under which revisions to the FMEP will be made and how the revisions will likely be accomplished should be included.**

The mean age of maturation for most steelhead and salmon population is five years and it makes little sense to evaluate this FMEP sooner than that period of time. Therefore, comprehensive reviews will be repeated by WDFW at five-year intervals thereafter until such time as the wild stocks are recovered and de-listed. The comprehensive review process will provide WDFW with a broad view of the effectiveness of fisheries management in meeting this FMEP's objectives. If it is determined that fisheries management is not meeting the objectives of this FMEP, WDFW will make the appropriate revisions. The intent of this FMEP is to accomplish the objectives. It is not known if or what revisions will be made. Revisions will be made on a case by case basis. These comprehensive reviews will also incorporate any new information which may require revisions in assumptions or management strategies. The WDFW will consult with NMFS to determine if the revisions are the best and most appropriate management action to take in addressing the plans deficiencies.

**SECTION 4 CONSISTENCY OF FMEP WITH PLANS AND CONDITIONS SET WITHIN ANY FEDERAL COURT PROCEEDINGS**

Tribal fisheries below Bonneville Dam do not currently exist. It is unclear whether any tribes have treaty rights in the LCR tributaries. If the tribes are found to have treaty rights below Bonneville Dam, then WDFW will work with the tribes to develop tributary fisheries consistent with protection of listed species and harvest sharing. Treaty Indian fisheries promulgated by the member Tribes of the Columbia River Inter-Tribal Fish Commission may be conducted in the tributaries above Bonneville Dam. The Yakama Nation currently has fisheries in the Wind River watershed. This fishery is not regulated by WDFW. Each tribe has retained its authority to regulate its fisheries and issues fishery regulations through its respective governing bodies. The tribes are represented by their staff on the Technical Advisory Committee and participate in monitoring activities and data sharing with other parties. The tribes have policy and technical representation in the U.S. v. Oregon and PFMC/North-of-Falcon harvest management processes, and coordinate fisheries with the State managers and Columbia River Compact as necessary.

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## Appendix

Table A1 - Summary of age 3 CWT recoveries for 1989-2000 brood year Lewis Type N coho

	Brood Year/Release Location/CWT Code												
	1989		1990	1991	1992	1993	1994	1996	1997		1998		
	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R - NF 27.0168	LEWIS R - NF 27.0168	LEWIS R 27.0168	LEWIS R - NF 27.0168	LEWIS R - NF 27.0168	LEWIS R 27.0168	LEWIS R - NF 27.0168	LEWIS R - NF 27.0168
	63-55-31	63-55-32	63-43-43	63-47-27	63-51-01	63-54-62	63-58-02	63-03-39	63-05-60	63-05-61 (NoAdClip)	63-11-16*2	63-09-13 (NoAdClip)	63-09-14
<u>Tag recoveries</u>													
AK	0	0	0	3	0	0	0	0	0	0	0	0	0
BC	16	108	50	74	42	3	11	0	8	0	0	0	133
Oregon/Washington coast	337	507	229	2	31	38	85	228	569	27	0	78	1,386
Columbia River	193	312	98	42	1	31	158	307	821	802	0	1,457	1,382
Puget Sound/SJF	0	26	5	8	0	0	4	4	0	0	0	11	26
Total fishery recoveries	545	954	382	129	73	73	258	538	1,399	829	0	1,547	2,928
Escapement	215	287	138	224	64	463	303	715	711	965	0	2,740	2,180
Grand Total	760	1,240	520	353	137	536	562	1,253	2,109	1,794	0	4,287	5,108
<u>Exploitation rate</u>													
AK	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	2.0%	8.7%	9.5%	20.9%	30.4%	0.6%	2.0%	0.0%	0.4%	0.0%	0.0%	0.0%	2.6%
Oregon/Washington coast	44.3%	40.9%	44.1%	0.6%	22.5%	7.1%	15.2%	18.2%	27.0%	1.5%	0.0%	1.8%	27.1%
Columbia River	25.4%	25.2%	18.9%	11.9%	0.7%	5.9%	28.1%	24.5%	38.9%	44.7%	0.0%	34.0%	27.1%
Puget Sound/SJF	0.0%	2.1%	1.0%	2.3%	0.0%	0.0%	0.7%	0.3%	0.0%	0.0%	0.0%	0.3%	0.5%
Total fishery recoveries	71.7%	76.9%	73.5%	36.5%	53.6%	13.5%	46.0%	42.9%	66.3%	46.2%	0.0%	36.1%	57.3%
Escapement	28.3%	23.1%	26.5%	63.5%	46.4%	86.5%	54.0%	57.1%	33.7%	53.8%	0.0%	63.9%	42.7%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%	100.0%
<u>Fishery distribution</u>													
AK	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	2.9%	11.4%	13.0%	57.2%	56.6%	4.5%	4.3%	0.0%	0.6%	0.0%	0.0%	0.0%	4.6%
Oregon/Washington coast	61.8%	53.2%	59.9%	1.7%	42.0%	52.2%	33.0%	42.3%	40.7%	3.2%	0.0%	5.1%	47.3%
Columbia River	35.4%	32.7%	25.7%	32.5%	1.4%	43.2%	61.2%	57.0%	58.7%	96.8%	0.0%	94.2%	47.2%
Puget Sound/SJF	0.0%	2.7%	1.4%	6.2%	0.0%	0.0%	1.5%	0.7%	0.0%	0.0%	0.0%	0.7%	0.9%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%	100.0%

Table A1 (continued) - Summary of age 3 CWT recoveries for Lewis Type N coho

	Brood Year/Release Location/CWT Code					
	1999				2000	
	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R - NF 27.0168	LEWIS R - NF 27.0168
	63-62-32	63-62-33 (NoAdClip)	63-63-35 (NoAdClip)	63-63-36	63-08-97	63-08-98 (NoAdClip)
<u>Tag recoveries</u>						
AK	0	0	0	0	0	0
BC	0	0	0	0	102	0
Oregon/Washington coast	128	5	0	127	1,466	37
Columbia River	204	205	217	234	1,140	1,404
Puget Sound/SJF	0	0	0	0	35	2
Total fishery recoveries	332	211	217	361	2,744	1,443
Escapement	309	365	319	352	1,507	1,963
Grand Total	641	575	536	713	4,251	3,406
<u>Exploitation rate</u>						
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.0%	0.0%	0.0%	0.0%	2.4%	0.0%
Oregon/Washington coast	20.0%	0.9%	0.0%	17.9%	34.5%	1.1%
Columbia River	31.8%	35.7%	40.4%	32.8%	26.8%	41.2%
Puget Sound/SJF	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%
Total fishery recoveries	51.8%	36.6%	40.4%	50.6%	64.6%	42.4%
Escapement	48.2%	63.4%	59.6%	49.4%	35.4%	57.6%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<u>Fishery distribution</u>						
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.0%	0.0%	0.0%	0.0%	3.7%	0.0%
Oregon/Washington coast	38.6%	2.6%	0.0%	35.3%	53.4%	2.6%
Columbia River	61.4%	97.4%	100.0%	64.7%	41.5%	97.3%
Puget Sound/SJF	0.0%	0.0%	0.0%	0.0%	1.3%	0.1%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table A2 - Summary of age 3 CWT recoveries for 1990-2000 brood year Lewis Type S coho

	Brood Year/Release Location/CWT Code										
	1990		1992	1993	1994	1995		1996		1997	
	SPEELYAI CR 27.0430	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R - NF 27.0168	LEWIS R - NF 27.0168	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R - NF 27.0168	LEWIS R - NF 27.0168
	63-43-42	63-47-24	63-50-63	63-54-63	63-57-63	63-61-46 (NoAdClip)	63-61-47	63-61-55 (NoAdClip)	63-61-56	63-05-58	63-05-59 (NoAdClip)
<u>Tag recoveries</u>											
AK	0	0	0	0	0	0	3	0	0	0	0
BC	3	0	6	17	0	0	0	0	0	0	0
Oregon/Washington coast	94	0	42	43	17	22	27	8	107	279	10
Columbia River	53	3	5	34	76	5	107	40	141	213	23
Puget Sound/SJF	0	0	0	0	0	4	0	0	0	0	0
Total fishery recoveries	151	3	53	94	93	32	137	49	248	492	33
Escapement	69	224	110	196	224	477	416	1,232	984	1,406	1,528
Grand Total	220	227	163	290	317	509	553	1,281	1,232	1,898	1,561
<u>Exploitation rate</u>											
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%
BC	1.6%	0.0%	3.4%	5.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Oregon/Washington coast	42.8%	0.0%	25.8%	14.8%	5.4%	4.4%	4.8%	0.6%	8.7%	14.7%	0.7%
Columbia River	24.2%	1.3%	3.2%	11.8%	23.8%	1.1%	19.3%	3.2%	11.4%	11.2%	1.5%
Puget Sound/SJF	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%
Total fishery recoveries	68.5%	1.3%	32.4%	32.4%	29.2%	6.3%	24.8%	3.8%	20.1%	25.9%	2.1%
Escapement	31.5%	98.7%	67.6%	67.6%	70.8%	93.7%	75.2%	96.2%	79.9%	74.1%	97.9%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<u>Fishery distribution</u>											
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	0.0%	0.0%	0.0%	0.0%
BC	2.3%	0.0%	10.5%	18.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Oregon/Washington coast	62.4%	0.0%	79.7%	45.7%	18.5%	69.7%	19.5%	16.9%	43.2%	56.6%	31.4%
Columbia River	35.3%	100.0%	9.8%	36.3%	81.5%	16.9%	78.0%	83.1%	56.8%	43.4%	68.6%
Puget Sound/SJF	0.0%	0.0%	0.0%	0.0%	0.0%	13.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table A2 (continued) - Summary of age 3 CWT recoveries for 1990-2000 brood year Lewis Type S coho

	Brood Year/Release Location/CWT Code							
	1998			1999			2000	
	LEWIS R 27.0168	LEWIS R - NF 27.0168	LEWIS R - NF 27.0168	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R 27.0168	LEWIS R - NF 27.0168	LEWIS R - NF 27.0168
	63-09-11	63-08-20 (NoAdClip)	63-08-23	63-11-04	63-12-09 (NoAdClip)	63-03-88	63-05-76	63-05-77 (NoAdClip)
<u>Tag recoveries</u>								
AK	0	0	0	0	0	0	0	0
BC	0	0	1	0	0	0	0	0
Oregon/Washington coast	168	27	704	92	2	80	992	35
Columbia River	186	163	826	170	134	122	427	99
Puget Sound/SJF	0	6	0	0	0	0	0	1
Total fishery recoveries	354	196	1,531	263	136	202	1,419	135
Escapement	41	3,678	2,651	1,105	1,406	139	2,706	3,707
Grand Total	395	3,873	4,182	1,367	1,542	341	4,125	3,842
<u>Exploitation rate</u>								
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Oregon/Washington coast	42.6%	0.7%	16.8%	6.7%	0.1%	23.5%	24.0%	0.9%
Columbia River	47.0%	4.2%	19.7%	12.5%	8.7%	35.7%	10.4%	2.6%
Puget Sound/SJF	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total fishery recoveries	89.6%	5.1%	36.6%	19.2%	8.8%	59.3%	34.4%	3.5%
Escapement	10.4%	94.9%	63.4%	80.8%	91.2%	40.7%	65.6%	96.5%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<u>Fishery distribution</u>								
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Oregon/Washington coast	47.6%	13.8%	46.0%	35.1%	1.1%	39.7%	69.9%	25.7%
Columbia River	52.4%	83.4%	53.9%	64.9%	98.9%	60.3%	30.1%	73.5%
Puget Sound/SJF	0.0%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table A3 - Summary of age 3 CWT recoveries for 1989-2000 brood year Cowlitz Type N coho

	Brood Year/Release Location/CWT Code											
	1989			1990			1991	1992		1993		
	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002
	63-14-62	63-39-23	63-39-24	63-42-53	63-42-54	63-43-44	63-47-30	63-53-48	63-53-49	63-48-58	63-57-27	63-59-55
<u>Tag recoveries</u>												
AK	0	0	0	7	0	0	0	0	0	0	0	0
BC	54	8	43	23	23	43	18	30	18	7	10	9
Oregon/Washington coast	330	189	348	211	93	121	0	28	17	0	30	40
Columbia River	98	120	67	30	38	24	11	2	0	0	1	18
Puget Sound/SJF	4	0	0	0	0	0	0	0	0	0	0	0
Total fishery recoveries	486	317	458	271	154	188	29	60	35	7	41	66
Escapement	170	125	222	146	62	102	81	30	38	8	102	103
Grand Total	655	442	680	417	216	290	110	89	73	15	143	170
<u>Exploitation rate</u>												
AK	0.0%	0.0%	0.0%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	8.2%	1.9%	6.4%	5.4%	10.6%	14.8%	16.4%	34.0%	24.9%	46.4%	7.1%	5.4%
Oregon/Washington coast	50.3%	42.7%	51.2%	50.6%	43.2%	41.7%	0.0%	31.0%	23.4%	0.0%	20.8%	23.3%
Columbia River	14.9%	27.1%	9.8%	7.3%	17.6%	8.4%	9.8%	1.8%	0.0%	0.0%	1.0%	10.5%
Puget Sound/SJF	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total fishery recoveries	74.1%	71.6%	67.3%	65.1%	71.3%	64.8%	26.3%	66.9%	48.3%	46.4%	28.8%	39.2%
Escapement	25.9%	28.4%	32.7%	34.9%	28.7%	35.2%	73.7%	33.1%	51.7%	53.6%	71.2%	60.8%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<u>Fishery distribution</u>												
AK	0.0%	0.0%	0.0%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	11.1%	2.6%	9.4%	8.3%	14.8%	22.8%	62.5%	50.9%	51.6%	100.0%	24.6%	13.7%
Oregon/Washington coast	67.9%	59.6%	76.0%	77.8%	60.5%	64.3%	0.0%	46.4%	48.4%	0.0%	72.1%	59.5%
Columbia River	20.1%	37.8%	14.6%	11.2%	24.7%	12.9%	37.5%	2.7%	0.0%	0.0%	3.3%	26.8%
Puget Sound/SJF	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table A3 (continued) - Summary of age 3 CWT recoveries for 1989-2000 brood year Cowlitz Type N coho

	Brood Year/Release Location/CWT Code										
	1994		1997								
	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002
	63-57-30	63-57-31	63-02-06	63-02-07	63-02-08	63-02-09	63-08-45	63-08-46	63-08-48	63-08-51	63-08-53
<u>Tag recoveries</u>											
AK	0	0	0	0	0	0	0	0	0	0	0
BC	0	0	0	0	0	0	0	0	0	0	0
Oregon/Washington coast	23	58	26	48	42	52	60	44	49	70	61
Columbia River	1	11	65	77	66	56	44	79	59	95	77
Puget Sound/SJF	0	4	0	0	0	0	0	0	0	0	0
Total fishery recoveries	24	73	91	125	108	108	103	122	107	165	138
Escapement	81	144	38	86	61	59	53	59	69	69	71
Grand Total	105	217	129	211	169	167	156	182	176	234	209
<u>Exploitation rate</u>											
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Oregon/Washington coast	22.0%	26.6%	20.4%	22.8%	24.8%	31.2%	38.3%	24.1%	27.7%	29.8%	29.3%
Columbia River	1.1%	5.2%	50.0%	36.4%	38.9%	33.4%	27.9%	43.2%	33.2%	40.8%	36.7%
Puget Sound/SJF	0.0%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total fishery recoveries	23.1%	33.6%	70.4%	59.2%	63.6%	64.5%	66.1%	67.3%	60.9%	70.6%	66.0%
Escapement	76.9%	66.4%	29.6%	40.8%	36.4%	35.5%	33.9%	32.7%	39.1%	29.4%	34.0%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<u>Fishery distribution</u>											
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Oregon/Washington coast	95.4%	79.3%	29.0%	38.6%	38.9%	48.3%	57.9%	35.8%	45.5%	42.2%	44.4%
Columbia River	4.6%	15.4%	71.0%	61.4%	61.1%	51.7%	42.1%	64.2%	54.5%	57.8%	55.6%
Puget Sound/SJF	0.0%	5.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table A3 (continued) - Summary of age 3 CWT recoveries for 1989-2000 brood year Cowlitz Type N coho

	Brood Year/Release Location/CWT Code								
	1998								
	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002
	63-11-33	63-11-15	63-11-27	63-11-29	63-11-30	63-11-33	63-11-34	63-11-36	63-11-46
<u>Tag recoveries</u>									
AK	0	0	0	0	0	0	0	0	0
BC	0	0	0	0	28	0	0	0	28
Oregon/Washington coast	0	301	322	301	158	270	284	254	546
Columbia River	0	294	375	354	137	244	368	244	178
Puget Sound/SJF	0	5	5	10	3	17	0	6	10
Total fishery recoveries	0	599	702	665	325	531	652	504	761
Escapement	0	311	326	258	148	250	259	242	649
Grand Total	0	910	1,028	923	473	781	911	746	1,410
<u>Exploitation rate</u>									
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.0%	0.0%	0.0%	0.0%	5.8%	0.0%	0.0%	0.0%	2.0%
Oregon/Washington coast	0.0%	33.0%	31.4%	32.6%	33.3%	34.6%	31.2%	34.1%	38.7%
Columbia River	0.0%	32.3%	36.5%	38.4%	29.0%	31.3%	40.4%	32.7%	12.6%
Puget Sound/SJF	0.0%	0.5%	0.4%	1.1%	0.6%	2.2%	0.0%	0.8%	0.7%
Total fishery recoveries	0.0%	65.8%	68.3%	72.1%	68.7%	68.0%	71.6%	67.6%	54.0%
Escapement	0.0%	34.2%	31.7%	27.9%	31.3%	32.0%	28.4%	32.4%	46.0%
Grand Total	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<u>Fishery distribution</u>									
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.0%	0.0%	0.0%	0.0%	8.5%	0.0%	0.0%	0.0%	3.6%
Oregon/Washington coast	0.0%	50.2%	45.9%	45.2%	48.5%	50.8%	43.6%	50.4%	71.7%
Columbia River	0.0%	49.0%	53.4%	53.2%	42.2%	46.0%	56.4%	48.4%	23.3%
Puget Sound/SJF	0.0%	0.8%	0.7%	1.5%	0.8%	3.2%	0.0%	1.1%	1.3%
Grand Total	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table A3 (continued) - Summary of age 3 CWT recoveries for 1989-2000 brood year Cowlitz Type N coho

	Brood Year/Release Location/CWT Code												
	1999												2000
	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002	COWLITZ R 26.0002
	63-03-65	63-03-92	63-03-93	63-03-94	63-03-95	63-09-56	63-09-57	63-09-58	63-09-59	63-09-60	63-09-61	63-09-63	63-05-85
<u>Tag recoveries</u>													
AK	0	0	0	0	0	0	0	0	0	0	0	0	0
BC	0	0	0	0	0	0	0	0	0	0	0	0	0
Oregon/Washington coast	214	63	66	5	84	58	55	103	71	73	47	57	669
Columbia River	136	83	49	5	42	46	68	63	53	60	95	91	518
Puget Sound/SJF	0	0	0	0	0	0	1	0	0	0	0	0	18
Total fishery recoveries	350	146	116	10	126	105	124	166	123	133	143	149	1,205
Escapement	456	44	98	31	143	36	44	37	35	88	76	56	719
Grand Total	806	191	213	41	269	141	169	203	158	221	218	204	1,924
<u>Exploitation rate</u>													
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Oregon/Washington coast	26.5%	33.2%	31.0%	12.6%	31.2%	41.5%	32.5%	50.6%	44.5%	33.2%	21.7%	28.1%	34.8%
Columbia River	16.9%	43.5%	23.2%	11.9%	15.6%	32.8%	40.4%	31.1%	33.3%	27.1%	43.7%	44.6%	26.9%
Puget Sound/SJF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%
Total fishery recoveries	43.4%	76.8%	54.2%	24.4%	46.8%	74.3%	73.7%	81.7%	77.9%	60.3%	65.4%	72.8%	62.6%
Escapement	56.6%	23.2%	45.8%	75.6%	53.2%	25.7%	26.3%	18.3%	22.1%	39.7%	34.6%	27.2%	37.4%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<u>Fishery distribution</u>													
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Oregon/Washington coast	61.2%	43.3%	57.2%	51.4%	66.7%	55.9%	44.1%	62.0%	57.2%	55.0%	33.2%	38.7%	55.5%
Columbia River	38.8%	56.7%	42.8%	48.6%	33.3%	44.1%	54.7%	38.0%	42.8%	45.0%	66.8%	61.3%	43.0%
Puget Sound/SJF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table A4 - Summary of age 3 CWT recoveries for 1989-2000 brood year Toutle Type S coho

	Brood Year/Release Location/CWT Code									
	1889	1990	1991					1992	1993	1994
	TOUTLE R-NF +GREEN	GREEN R 26.0323	TOUTLE R-NF 26.0314	TOUTLE R-NF 26.0314	TOUTLE R-NF 26.0314	TOUTLE R-NF 26.0314	GREEN R 26.0323	GREEN R 26.0323	GREEN R 26.0323	GREEN R 26.0323
	63-56-32	63-42-48	63-46-27	63-46-28	63-46-29	63-46-30	63-46-42	63-51-06	63-53-53	63-54-48
<u>Tag recoveries</u>										
AK	0	0	0	0	0	0	0	0	0	0
BC	0	11	0	0	0	0	4	0	4	0
Oregon/Washington coast	91	225	0	0	2	0	0	4	3	7
Columbia River	10	159	0	0	0	0	10	0	4	74
Puget Sound/SJF	0	0	0	0	0	0	0	0	0	0
Total fishery recoveries	101	395	0	0	2	0	14	4	11	81
Escapement	47	296	18	61	58	25	247	23	23	80
Grand Total	148	692	18	61	60	25	261	27	34	161
<u>Exploitation rate</u>										
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	11.0%	0.0%
Oregon/Washington coast	61.7%	32.6%	0.0%	0.0%	3.5%	0.0%	0.0%	15.5%	9.7%	4.3%
Columbia River	6.5%	23.0%	0.0%	0.0%	0.0%	0.0%	3.8%	0.0%	11.6%	45.9%
Puget Sound/SJF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total fishery recoveries	68.2%	57.2%	0.0%	0.0%	3.5%	0.0%	5.5%	15.5%	32.3%	50.1%
Escapement	31.8%	42.8%	100.0%	100.0%	96.5%	100.0%	94.5%	84.5%	67.7%	49.9%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<u>Fishery distribution</u>										
AK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.0%	2.7%	0.0%	0.0%	0.0%	0.0%	30.0%	0.0%	34.1%	0.0%
Oregon/Washington coast	90.5%	57.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	30.0%	8.5%
Columbia River	9.5%	40.3%	0.0%	0.0%	0.0%	0.0%	70.0%	0.0%	35.9%	91.5%
Puget Sound/SJF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	100.0%	100.0%	0.0%	0.0%	100.0%	0.0%	100.0%	100.0%	100.0%	100.0%

Table A4 (continued) - Summary of age 3 CWT recoveries for 1989-2000 brood year Toutle Type S coho

	Brood Year/Release Location/CWT Code									
	1995	1996	1997	1998		1999				
	GREEN R 26.0323	GREEN R 26.0323	GREEN R 26.0323	GREEN R 26.0323	GREEN R 26.0323	TOUTLE R-NF 26.0314	TOUTLE R-NF 26.0314	TOUTLE R-NF 26.0314	GREEN R 26.0323	GREEN R 26.0323
	63-62-35	63-05-35	63-08-29	63-02-24	63-12-27	63-05-70	63-10-62	63-10-63	63-03-64	63-05-64
<u>Tag recoveries</u>										
AK	2	0	0	0	0	0	0	0	0	0
BC	1	0	0	0	0	0	0	0	0	0
Oregon/Washington coast	36	67	89	91	84	90	193	224	137	56
Columbia River	116	122	291	281	231	147	352	355	316	90
Puget Sound/SJF	0	0	0	0	0	0	0	0	0	0
Total fishery recoveries	155	189	380	371	315	237	545	579	453	146
Escapement	1,339	268	664	217	202	523	1,337	1,347	1,087	461
Grand Total	1,494	457	1,044	588	517	759	1,882	1,926	1,540	607
<u>Exploitation rate</u>										
AK	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Oregon/Washington coast	2.4%	14.7%	8.5%	15.4%	16.3%	11.8%	10.3%	11.6%	8.9%	9.2%
Columbia River	7.8%	26.6%	27.9%	47.7%	44.6%	19.3%	18.7%	18.5%	20.5%	14.9%
Puget Sound/SJF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total fishery recoveries	10.4%	41.3%	36.4%	63.1%	60.9%	31.1%	29.0%	30.1%	29.4%	24.1%
Escapement	89.6%	58.7%	63.6%	36.9%	39.1%	68.9%	71.0%	69.9%	70.6%	75.9%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<u>Fishery distribution</u>										
AK	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BC	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Oregon/Washington coast	23.2%	35.5%	23.4%	24.4%	26.7%	38.0%	35.4%	38.6%	30.3%	38.4%
Columbia River	74.7%	64.5%	76.6%	75.6%	73.3%	62.0%	64.6%	61.4%	69.7%	61.6%
Puget Sound/SJF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table A4 (continued) - Summary of age 3 CWT recoveries for 1989-2000 brood year Toutle Type S coho

	Brood Year/Release Location/CWT Code						
	2000						
	TOUTLE R-NF 26.0314	TOUTLE R-NF 26.0314	TOUTLE R-NF 26.0314	TOUTLE R-NF 26.0314	TOUTLE R-NF 26.0314	GREEN R 26.0323	GREEN R 26.0323
	63-09-68	63-09-69	63-09-89	63-10-90	64-09-69	63-09-55	63-11-94
<u>Tag recoveries</u>							
AK	0	0	0	0	Bad	0	0
BC	0	0	0	0	CWT	0	0
Oregon/Washington coast	350	279	219	135	code	63	141
Columbia River	324	178	104	87	(duplicate	78	177
Puget Sound/SJF	0	0	0	0	of	0	5
Total fishery recoveries	673	456	322	223	63-09-69)	141	323
Escapement	1,177	878	413	395		275	553
Grand Total	1,850	1,334	735	617		416	876
<u>Exploitation rate</u>							
AK	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
BC	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
Oregon/Washington coast	18.9%	20.9%	29.7%	21.9%		15.1%	16.1%
Columbia River	17.5%	13.3%	14.1%	14.1%		18.8%	20.2%
Puget Sound/SJF	0.0%	0.0%	0.0%	0.0%		0.0%	0.5%
Total fishery recoveries	36.4%	34.2%	43.8%	36.0%		33.9%	36.8%
Escapement	63.6%	65.8%	56.2%	64.0%		66.1%	63.2%
Grand Total	100.0%	100.0%	100.0%	100.0%		100.0%	100.0%
<u>Fishery distribution</u>							
AK	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
BC	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
Oregon/Washington coast	51.9%	61.1%	67.8%	60.8%		44.5%	43.7%
Columbia River	48.1%	38.9%	32.2%	39.2%		55.5%	54.8%
Puget Sound/SJF	0.0%	0.0%	0.0%	0.0%		0.0%	1.5%
Grand Total	100.0%	100.0%	100.0%	100.0%		100.0%	100.0%